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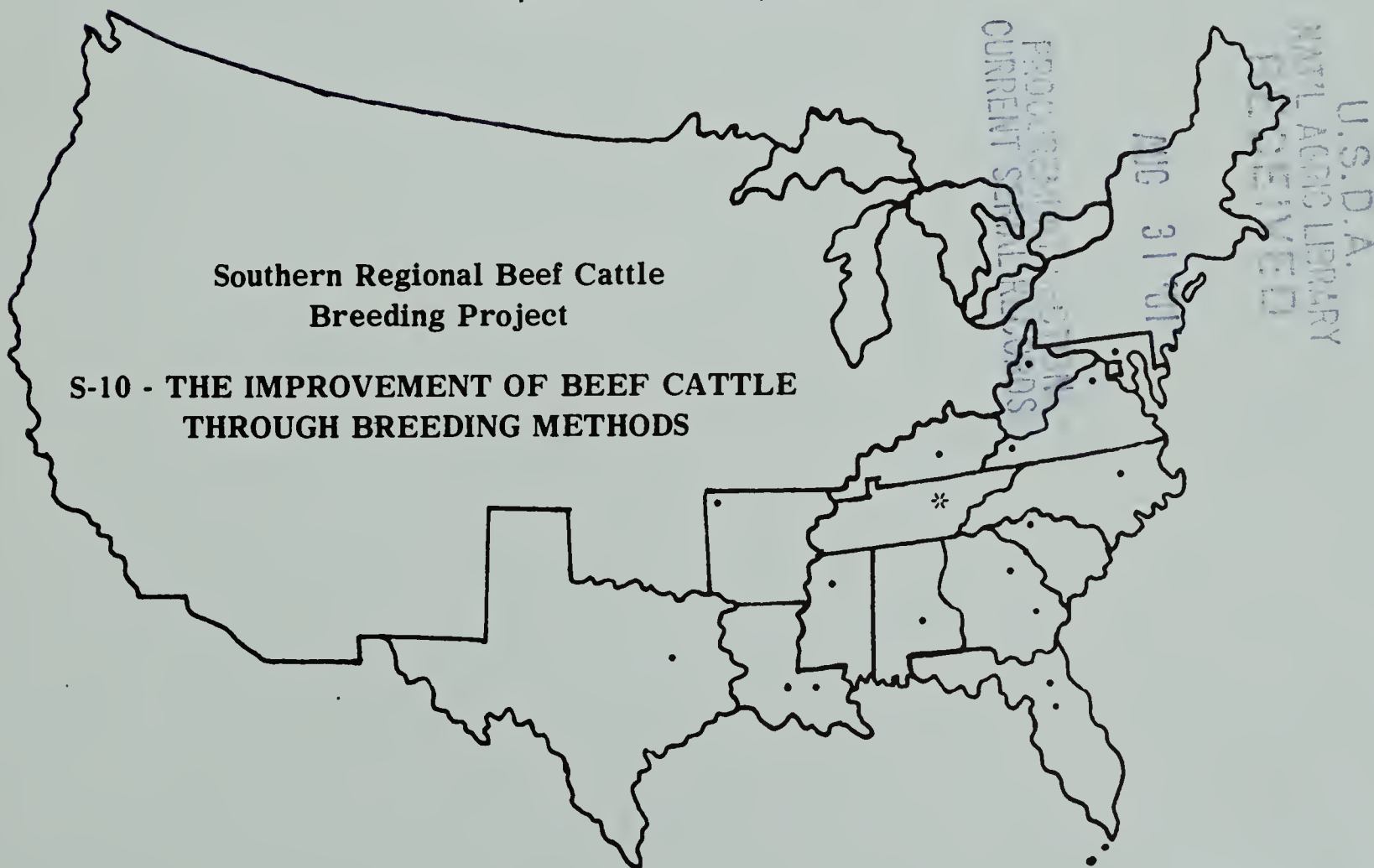
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UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE  
ANIMAL HUSBANDRY RESEARCH DIVISION  
and  
COOPERATING SOUTHERN STATES

1966-1967 Annual Report of S-10  
and

Report of Annual Technical Committee Meeting  
University of Tennessee  
Knoxville, Tennessee  
September 7-9, 1967



This report is intended for the use of administrative leaders and workers  
and is not for general publication.





S-10 - 1967 ANNUAL REPORT



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## INTRODUCTION

This project was initiated in 1948 to investigate and develop methods of breeding more productive beef cattle for the South. Detailed annual reports showing research developments and progress in each state have been prepared each year since 1950. Complete results of certain phases of the project have been reported in regional bulletins and technical articles and bulletins published by workers in the various states which contribute to the S-10 project.

This publication includes the proceedings of the 1967 annual meeting of the S-10 Technical Committee and the annual reports of projects in each of the 12 contributing states. The annual reports of S-10 contributing and supporting projects were prepared by the project leaders and other personnel at the various stations as summaries of the research developments and progress at each station during 1966. The results are not considered final, but the materials aid cooperators in developing an integrated program. This report also provides information needed by heads of animal husbandry departments, experiment station directors, and U. S. Department of Agriculture officials for evaluation of the projects with respect to objectives and procedures. This report is not for the general distribution, and material contained in it should not be quoted in publications.

PROGRAM  
S-10 TECHNICAL COMMITTEE MEETING  
Crossville and Knoxville, Tennessee  
7, 8, 9 September 1967

Wednesday, September 6

Participants to arrive at Crossville, Tennessee

Lodging - Capri Motel

Thursday, September 7

Work at the University of Tennessee

7:30 (C.D.T.)      Inspection of pastures and cattle at Plateau  
Experiment Station  
J. A. Odom, C. S. Hobbs and R. R. Shrode

9:00                Convene for session in Plateau Experiment  
Station Conference Room  
C. S. Hobbs presiding

9:10                Effects of inbreeding in the Angus herd at  
Plateau Experiment Station  
Will T. Butts, Jr.

9:50                Coffee

10:00              Meats research at the University of Tennessee  
C. B. Ramsey and W. R. Backus

11:00              Lunch, B. and W. Restaurant

Depart for Knoxville immediately after lunch  
Lodging at Knoxville - Tennessee Host Motel

Opening Session of Committee Meeting, Room 203,  
Brehm Animal Science Building  
Committee Chairman C. E. Lindley presiding

3:00 (E.D.T.)      Welcome to Tennessee  
Dr. J. A. Ewing, Director, Tennessee Agricultural  
Experiment Station

Brief Progress Reports of Cooperating Stations

3:15	Alabama	T. B. Patterson
3:30	Arkansas	C. J. Brown
3:45	Florida	M. Koger
4:00	Florida, Brooksville	W. C. Burns



4:15	Georgia	W. C. McCormick
4:30	Kentucky	Fred Thrift
4:45	Louisiana	J. W. Turner
5:00	La., Jeanerette	D. C. Meyerhoeffer

Evening Session, Simple Simon Restaurant  
J. E. Legates presiding

7:00 Dinner

Guest Speaker: Dr. Dewey L. Harris, DeKalb  
Agricultural Association, Inc.,  
Topic: What can beef cattle breeders learn  
from poultry breeders?

Friday, September 8

7:30 Visit to U. T. and Alcoa herds - C. S. Hobbs

Morning Session, Room 203, Brehm Animal Science  
Building - J. A. Gaines presiding

9:15 Effect of rate of growth and nutrition of heifer  
calves from birth to weaning on future productivity  
Guest Lecturer: Dr. R. C. Carter, Virginia  
Polytechnic Institute

9:55 Questions and discussion

10:00 Coffee

10:10 Effect of growth and nutrition of females through  
nursing second calf (or to 45 months of age)  
on cow productivity  
Guest Lecturer: Dr. Robert Totusek, Oklahoma  
State University

10:50 Questions and discussion

10:55 Effects of nutrition on cow fertility and productivity  
Guest Lecturer: Dr. J. N. Wiltbanks, Colorado  
State University

11:35 Questions and discussion with comments from stations  
having data and/or experience bearing on the topics  
discussed by the three morning speakers.

12:00 Lunch - U. T. Block and Bridle Club

Afternoon Session, Room 203, Brehm Animal Science Bldg.  
C. J. Brown presiding

12:30 Panel Discussion: Performance testing programs  
and their use by breeders  
Moderator - Doyle Chambers  
Panel members: A.L. Eller, Jr. Virginia  
J. W. Patterson North Carolina  
H. M. Jamison Tennessee

1:30 Depart for Oak Ridge

2:30 Visit Atomic Energy Museum

4:15 Visit U. T. - A.E.C. Agricultural Research Lab.  
R. L. Murphree

Evening Session, Simple Simon Restaurant  
R. R. Shrode presiding

7:00 Dinner

Guest speaker: Mr. Orville Sweet, American  
Polled Hereford Association  
Topic: The use of records - past, present  
and future.

Saturday, September 9

Closing Session, Room 203, Brehm Animal Science Bldg.  
Committee Chairman C. E. Lindley presiding

8:00 Committee reports

9:00 Comments by: Administrative advisor  
AHRD representative  
CSRS representative  
Investigations Leader

10:00 - 12:00 Conclusion of business

In addition to the usual business, to include  
some discussion on what particular problem areas  
can be coordinated on a regional basis and what  
are the currently most critical problems on which  
an intensified, fully coordinated regional effort  
is most needed.



MINUTES OF S-10 TECHNICAL COMMITTEE MEETING  
KNOXVILLE, TENNESSEE  
September 7, 8, 9, 1967

The business meeting was called to order by the Chairman, Dr. C. E. Lindley, in Room 203, Brehm Animal Science Building, University of Tennessee, at 2 p.m. Friday, September 8, 1967. Those in attendance were:

C. J. Brown, Animal Science Dept., Univ. of Arkansas, Fayetteville, Arkansas.  
Doyle Chambers, Louisiana State Univ. Agri. Expt. Sta., Baton Rouge, La.  
T. B. Patterson, Auburn University, Auburn Alabama  
H. A. Stewart, North Carolina State Agri. Expt. Sta., Raleigh, North Carolina.  
W. T. Ahlschwede, North Carolina State Univ., Raleigh, North Carolina  
J. E. Legates, North Carolina State Univ., Raleigh, North Carolina  
James Riley Hill, Jr., Clemson University, Edisto Expt. Sta., Blackville, S.C.  
J. Ralph Overfield, Western Kentucky Substation, Princeton, Kentucky  
Bill Turner, Louisiana State University, Animal Sci. Dept., Baton Rouge, La.  
Barton Farthing, Louisiana State University, Baton Rouge, La.  
Prentiss Schilling, Louisiana State University, Baton Rouge, La.  
W. C. Burns, Beef Cattle Research Station, Brooksville, Fla.  
Marvin Koger, University of Florida, Gainesville, Florida  
R. C. Carter, Virginia Polytechnic Institute, representing Coop. St. Res. Service, USDA. Washington, D.C.  
K. P. Bovard, Virginia Polytechnic Institute and Beef Cattle Research Station, Front Royal, Virginia  
Walter Neville, Agri. Expt. Station, Experiment, Georgia  
E. J. Warwick, U. S.D.A., Beltsville, Maryland  
Ismael Carlo, Univ. of Puerto Rico Agri. Expt. Station, Puerto Rico  
T. M. Clyburn, Georgia Coastal Plain Expt. Station, Reidsville, Georgia  
W. C. McCormick, Georgia Coastal Plain Expt. Station, Tifton, Georgia  
Robert Scarth, University of Georgia, Athens, Georgia  
W. C. Godley, Clemson University, Clemson, South Carolina  
H. A. Fitzhugh, Jr., Texas A and M University, College Station, Texas  
Dewey L. Harris, De Kalb Agri. Assoc., Inc., De Kalb, Illinois  
Robert R. Shrode, University of Tennessee, Knoxville, Tennessee  
Will T. Butts, Jr., Investigations Leader S-10, Knoxville, Tennessee  
Charles S. Hobbs, Sr., University of Tennessee, Knoxville, Tennessee  
J. A. Gaines, Virginia Polytechnic Institute, Blacksburg, Virginia  
C. E. Lindley, Mississippi State University, State College, Mississippi  
Thomas J. Marlowe, Virginia Polytechnic Institute, Blacksburg, Virginia  
A. E. Eller, Jr., Virginia Polytechnic Institute, Blacksburg, Virginia  
James W. Patterson, North Carolina State University, Raleigh, North Carolina  
Haley M. Jamison, University of Tennessee, Knoxville, Tennessee  
J. A. Odom, Plateau Expt. Station, Crossville, Tennessee  
C. B. Ramsey, University of Tennessee, Knoxville, Tennessee  
W. R. Backus, University of Tennessee, Knoxville, Tennessee  
J. A. Ewing, Tennessee Agri. Expt. Sta., Knoxville, Tennessee  
Robert Totusek, Oklahoma State University, Stillwater, Oklahoma  
J. N. Wiltbanks, Colorado State University, Fort Collins, Colorado  
R. L. Murphree, U.T. - A.E.C. Agri. Res. Lab., Knoxville and Oak Ridge, Tennessee  
Orville Sweet, American Polled Hereford Association



Minutes of S-10 Technical Committee Meeting  
Knoxville, Tennessee  
September 7, 8, 9, 1967

The minutes of the previous annual meeting, held at College Station, Texas, June 26-29, 1966, were approved as printed in the annual report for 1965-66.

The minutes of the S-10 Committee meeting held in New Orleans, Louisiana on January 30, 1967, were approved as read. Said minutes will be a part of this report.

Appreciation was expressed to C. J. Brown for preparing the 1965-66 report, and to C. S. Hobbs and E. J. Warwick for printing the report. Some errors in reporting of funds were mentioned, not the fault of C. J. Brown.

Dr. McCormick reported for the data collection and analysis committee. He mentioned a previous suggestion of the committee having to do with preparing a new form for collection of reproductive data. He suggested the committee would defer detailed action until the new Investigations Leader had time to get his feet on the ground.

Dr. Legates reported on the standardization of carcass and meats data, for the committee consisting of C. J. Brown, Marvin Koger, Troy Patterson, and J. E. Legates, Chairman. The rather comprehensive 1965 report, which was adopted by S-10, was reviewed, as well as "Recommended Procedures for Beef Carcass Evaluation" published by the American Meat Science Association in 1967. The 1965 report is considered adequate; no change recommended. Future changes will follow more factual information. More complete measures are, of course, acceptable.

Dr. Hobbs reported for the "Annual Report Forms" committee. He explained that the committee has been waiting for the new Investigations Leader, and it will act now that the waiting is over.

Dr. Chambers spoke to the group as administrative advisor. A brief summary of his remarks follows:

1. We may have to revise some of our procedures.
2. Welcome to Dr. Will Butts, our new Investigations Leader.
3. Funding of research was discussed; the priority position of S-10 research has improved during the past year.
4. The word regional means "two or more states with a common interest"; we need cooperative studies underway involving two or more states. Procedural questions would be ideal.
5. A task force will be appointed soon to study who's doing what and who should be doing what until about 1970.
6. There is nothing as dear to a research administrator as a good project proposal. This is one of the principal determiners of the amount of support the project will get.



Dr. Warwick commented to the group as AHRD representative, as follows:

1. There is need for increased cooperation. What are the problem areas? Which states are best suited to work on the problem? The quality of work is OK, but work is not specific enough with respect to problems.
2. It would appear that crossbreeding projects are becoming too numerous.
3. With respect to the formation of the national Performance Testing Council: A meeting was held in Denver in January, 1967, to discuss the idea, hosted by PRI. Representation was quite good. The opinion was expressed that all programs need to express the same things in the same terms, and a national organization would be a good thing. A report of the meeting was written, and it has had a good effect. An ad hoc committee was formed, with Frank Baker as Chairman, to draft a constitution and by-laws for a national organization. There will be a meeting in Omaha in September, 1967, to consider the work of the ad hoc committee, and to consider the organization.
4. Public and administrative recognition of the need for agricultural research has changed favorably.

Dr. Carter addressed the group as CSRS representatives:

1. In attending several technical committee meetings for CSRS, he has become quite impressed with the community of problems existent in beef cattle research.
2. There is need for regional effort in the solution of problems.
3. More time should be devoted to project reports and proposals for new projects.
4. NC-2 is working on selection for milk production in dairy cattle; it is a good example of regional research.
5. The beef cattle research community should consider a national program on the use and testing of inbred lines.

Dr. Lindley expressed a cordial welcome to Dr. Will Butts as incoming Investigations Leader, and called upon all members of S-10 to communicate their ideas to Dr. Butts, whereupon Dr. Lindley yielded the floor to Dr. Butts. Among other things, Dr. Butts opined that: (1) We have many unknowns and a limited number of equations with which to solve them, (2) Mass selection is probably the route for the present, and (3) we should keep research problem-oriented.

Dr. Arlo Stewart reminded the group that a few years ago a task force established priorities in research areas, and these were subscribed to by the Southern directors. He suggested we focus our attention on this report.

Dr. Lindley generated discussion of the possibility of holding a joint meeting with the regional beef cattle breeding committees. It was moved, seconded, and passed that the committee favors a joint meeting, but not until 1969 or 1970; the choice location was Clay Center and Lincoln, Nebraska.



The committee voted approval of Bill Turner's project proposal for Louisiana.

Dr. Godley rendered the following report of the resolutions committee:

Be it resolved that the S-10 Technical Committee express its appreciation to Dr. C. S. Hobbs, Dr. R. R. Shrode and the staff of the Animal Husbandry-Veterinary Science Dept., University of Tennessee, for their efforts in making the 20th Anniversary Meeting a success.

Be it further resolved that the committee express its special thanks to Mr. J. A. Odom and his staff for arranging and conducting the tour of the Plateau Experiment Station.

Be it further resolved that the Technical Committee express its appreciation to those guest speakers and panelists who contributed their time and talents to the program. Namely:

Dr. Dewey L. Harris, De Kalb Agric. Assoc., Inc.  
 Dr. R. C. Carter, Virginia Polytechnic Institute  
 Dr. Robert Totusek, Oklahoma State University  
 Dr. J. N. Wiltbank, Colorado State University  
 Mr. A. L. Eller, Jr., Extension Service, Va. Polytechnic Inst.  
 Mr. J. W. Patterson, Extension Service, N.C. State Univ.  
 Dr. H. M. Jamison, Agri. Expt. Sta. and Agri. Ext. Serv., U of Tenn.  
 Mr. Orville Sweet, Amer. Polled Hereford Association

Be it further resolved that this committee express its sincere thanks to those Tennessee Livestock Associations that provided the excellent dinners that the group enjoyed on September 7 and 8.

They are:

The Tennessee Angus Association  
 The Tennessee Charolais Association  
 The Tennessee Hereford Association  
 The Tennessee Polled Hereford Association  
 East Tennessee Angus Association  
 East Tennessee Polled Hereford Association  
 The Tennessee Livestock Association

We recommend that a copy of these resolutions as appropriate be sent to each of those mentioned in the resolution and to Dr. J. A. Ewing, Director, Tennessee Agricultural Experiment Station, Knoxville, Tennessee.

W. C. Godley  
 T. C. Cartwright

Peaceful elections were held; J. E. Legates was elected Secretary and Bill Turner was elected Committeeman.

The acting Secretary was directed to get copies of notes from the invited speakers, but this turned out to be impossible. Some of the speakers had already departed, and others did not use notes.

The 1968 meeting will be held in Florida. There was discussion of whether to meet annually, or less often than annually, and there was a unanimous opinion expressed in favor of an annual meeting.

There being no further business, the meeting was adjourned at 4:30 p.m.

Incoming Chairman for 1967-68 is J. A. Gaines, Virginia.

Respectfully,

J. A. Gaines  
Acting Secretary



ANNUAL REPORT OF COOPERATIVE REGIONAL PROJECTS  
January 1 to December 31, 1967

1. PROJECT: S-10, Improvement of Beef Cattle through Breeding Methods

2. COOPERATING AGENCIES AND PRINCIPAL LEADERS:

Cooperating State Experiment Stations and Technical Committee:

Alabama	T. B. Patterson
Arkansas	C. J. Brown
Florida	Marvin Koger
Georgia	W. C. McCormick
Kentucky	Fred Thrift
Louisiana	J. W. Turner
Mississippi	C. E. Lindley
North Carolina	J. E. Legates
South Carolina	W. C. Godley
Tennessee	C. S. Hobbs
Texas	T. C. Cartwright
Virginia	J. A. Gaines

U. S. Department of Agriculture Agencies and Leaders:

E. J. Warwick, Beef Cattle Research Branch, AHRD, ARS, Beltsville, Maryland

W. T. Butts, Jr., Investigations Leader, S-10, AHRD, Knoxville, Tennessee

W. C. Burns, Superintendent, West Central Florida Experiment Station, Brooksville, Florida

D. C. Meyerhoeffer, Superintendent, Iberia Livestock Experiment Station, Jeanerette, Louisiana

B. M. Priode, Superintendent, Beef Cattle Research Station, Front Royal, Virginia

M. J. Burris (resigned), Animal Geneticist, Cooperative State Research Service, Washington, D. C.

Regional Officers, 1966-67:

Doyle Chambers, Administrative Advisor, Baton Rouge, Louisiana

C. E. Lindley, Chairman, State College, Mississippi

N. W. Bradley, Secretary, Lexington, Kentucky

J. A. Gaines, Executive Committee Member, Blacksburg, Virginia

3. PROGRESS OF THE WORK AND PRINCIPAL ACCOMPLISHMENTS:

The wide ecological diversity in the S-10 region is reflected in the number of lines of investigation being conducted. Major objectives, in terms of amount of beef breeding resources committed, are the evaluation of systematic breeding procedures and the development and evaluation of selection criteria. Contributing projects from states in the Gulf Coast area have been influenced by the requirement for consideration of "adaptability" or "fitness" factors in cattle subjected to subtropical environment. Hence, studies evaluating the effects of crossbreeding and the importance of genetic-environmental interactions have received priority. Conversely, central and northern states in the S-10 group have tended to favor contributing projects whose major objectives are the estimation of genetic parameters and the evaluation of various breeding plans and selection criteria.

Of increasing interest to the S-10 group is a more rigorous specification of overall goals. Accumulated data from the regional project suggest the



need for a more thorough examination of the relationship between rate of gain, per se, and overall efficiency and profitability. Three states reported work in progress on the relationship between cow size and various performance traits. Data are being accumulated in Florida from a study of cow size as a correlated response to selection for "fitness". South Carolina reported small negative correlations between weight of dam and 210-day calf weight. Texas studies of data from 10 cooperating states have shown cow weight to be affected by location-year, breed, sire, age, and previous parity. Heritability and repeatability estimates for cow weights at parturition and weaning were determined. Two-thirds of the 45 individual herd estimates of heritability were reported to exceed 0.40. Repeatability estimates invariably exceeded 0.45. Data from Alabama, Georgia, and Texas were included in another cooperative S-10 study by the Texas station. Most rapidly gaining Angus and Hereford calves were dropped by dams weighing 1,257 lb. and 1,323 lb. respectively. Calves from dams that had raised all of their progeny exhibited lower preweaning and greater postweaning gains than did calves from dams of lesser fecundity. Post-weaning ADG was reported to be positively but not significantly related to weight of dam. Other analyses of S-10 data from several herds showed the ratio of average daily gain per unit of dam weight to be negatively related to dam weight in each herd.

Six states are conducting studies which will permit comparisons of straightbred and crossbred animals. Traits of interest are pre-and-postweaning performance, reproduction, and carcass characteristics. Alabama reported six years of work with Hereford, Hereford-Angus, and Hereford-Brahman cows bred to Hereford and Angus bulls. Weaning weight advantages for the crossbreds over the Hereford controls are 59, 48, and 26 pounds, respectively, for  $3/4$  Hereford -  $1/4$  Angus,  $3/4$  Angus -  $1/4$  Hereford, and  $7/8$  Hereford -  $1/8$  Brahman. The backcross calves were graded slightly higher for both type and condition than were the Herefords and the  $1/8$  Brahmans. Slaughter weight of steers following 85-day pasture and 145-day feed lot phases favored the crossbreds by 28, 20, and 16 pounds, respectively, for the breed groups previously mentioned. Final shrunk weight of the Hereford control steers was 980 pounds. Carcass differences were small. The  $3/4$  Angus steers were fatter with 0.68 in. fat over the rib as compared to 0.50 for the other three groups. Virginia summarized results to date (4 years) from a comparison of purebred and crossbred cows. Purebred (Angus, Hereford, and Shorthorn) and crossbred (two-breed crosses) bulls and cows were mated so as to produce three-breed and back-cross calves from both purebred and crossbred dams. Tentative conclusions are: (1) no difference between purebred and crossbred cows in percent calves weaned (when the calves are crossbred), (2) weaning weights of steer calves were 19 lb. and weaning weights of heifer calves were 15 lb. in favor of crossbred dams, (3) steer calves from crossbred dams weighed 37 lb. more at slaughter and heifer calves 20 lb. more than did calves from purebred dams. Other differences were small.

Four states are studying the importance of genetic-environmental interactions for various reproductive and performance traits. North Carolina failed to detect a significant sire x location interaction in a study involving three sires and four locations. The same study showed the sex of calf x age of dam interaction to be of negligible importance in calf performance. Estimation of environmental and genetic components are proceeding at all contributing stations. Major emphasis, at present, is directed toward obtaining more precise estimates of the genetic correlations between gain and various other traits of economic importance.



Both single-trait selection (5 states) and half-sib approaches are being employed. Virginia reported low heritability ( $0.03 + .20$ ) and repeatability ( $0.02 + .01$ ) estimates for calving interval. North Carolina, working with several measures of gain from birth to weaning, found that the covariance between the genetic value for a trait and the genetic value for the maternal influence on the traits was negative for all traits studied. In assessing environmental effects, Louisiana concluded that multiplicative adjustments for age of calf and sex and additive adjustments for age of dam were appropriate.

Mississippi, Tennessee and Virginia are cooperating in an investigation of inbreeding. Both the effects of inbreeding, per se, and the use of inbred lines in a systematic breeding plan are of interest. To date, under the selection procedures employed, levels of inbreeding under 20 percent do not appear to result in any serious depression in growth or mature size.

The development of immunogenetic and electrophoretic techniques by the basic beef cattle genetics laboratory at the Texas station has progressed to the point of these procedures becoming a useful tool in certain other contributing projects. Plans have been formalized for immunological evaluation of cattle in the inbred lines at Front Royal, Virginia.

#### 4. USEFULNESS OF FINDINGS:

Accumulated knowledge from the project has resulted in substantial progress in reducing duplication of effort in the region. Individual states are now able to bring more resources to bear on relatively fewer problems and, at the same time, to significantly increase the total number of investigations by the group. For example, the interlocking nature of S-10 contributing projects has allowed all states to make use of crossbreeding information obtained from regional research conducted by less than half of the member states. Current information is continually made available to beef producers by the cooperating state institutions and the United States Department of Agriculture.

#### 5. WORK PLANNED FOR NEXT YEAR:

Investigations will proceed according to project outlines.

#### 6. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR:

See attached list.

#### 7. APPROVED:

\_\_\_\_\_  
Date

\_\_\_\_\_  
Chairman, Technical Committee

\_\_\_\_\_  
Date

\_\_\_\_\_  
Regional Administrative Advisor



TABLE 1. Cattle Inventory and Percent Used in S-10 Contributing Projects  
July 1, 1967

State	Cows two years and over	Year- ling Heifers	Bulls and steers under one yr.	Heifers under one yr.	Bulls over one yr.	Steers over one yr.	Total No.	Per- cent Used
Alabama	348	113	226	184	27	-	898	100
Arkansas	352	100	96	123	72	-	743	100
Florida	3577	1150	1196	1244	258	250	7675	97
Georgia	675	169	280	291	30	69	1514	82
Kentucky	430	40	115	117	35	-	737	100
Louisiana	846	146	302	270	312	-	1876	100
Mississippi	461	88	-	-	-	-	549	77
North Carolina	330	101	128	111	1	74	745	87
South Carolina	214	67	72	61	23	-	437	100
Tennessee	475	85	185	218	92	-	1055	100
Texas	482	112	240	203	59	21	1117	100
Virginia	<u>116</u>	<u>-</u>	<u>49</u>	<u>47</u>	<u>12</u>	<u>-</u>	<u>224</u>	<u>90</u>
Subtotal	8306	2171	2889	2869	921	414	17570	
Federal-State Cooperative Stations:								
Brooksville, Fla.	450	120	143	127	132	-	972	100
Jeanerette, Louisiana	240	159	96	94	34	-	623	100
Front Royal, Virginia	<u>1437</u>	<u>396</u>	<u>532</u>	<u>523</u>	<u>171</u>	-	<u>3059</u>	100
Subtotal	2127	675	771	744	337		4654	
Total	10433	2846	3660	3613	1258	-	22224	

TABLE 2. Numbers of Animals Performance Tested and Slaughtered  
from S-10 Contributing Project in 1966-1967

State	Performance Tested			Slaughtered		
	Bulls	Heifers	Steers	Bulls	Heifers	Steers
Alabama	39	112	108	-	-	108
Arkansas	49	43	-	29	-	-
Florida	80	604	118	-	-	103
Georgia	52	138	60	7	10	60
Kentucky	71	61	9	59	9	9
Louisiana	-	-	99	-	-	97
Mississippi	-	-	14	-	-	14
North Carolina	20	52	74	17	-	69
South Carolina	9	67	45	-	-	45
Tennessee	95	99	-	-	-	-
Texas	35	162	70	-	-	-
Virginia	-	-	-	-	-	-
Subtotal	450	1338	597	114	19	505
Brooksville, Fla.	110	120	-	30	65	71
Jeanerette, Louisiana	37	-	-	16	-	-
Front Royal, Virginia	201	411	-	-	-	-
Subtotal	348	531	-	46	65	71
Total	798	1869	597	520	84	576

TABLE 3. Funds Expended on Beef Cattle Breeding Research in S-10 Herds During the Fiscal Year Ending June 30, 1967

State	Regional Research Funds	AHRD Funds	State- Controlled Funds	Income from Cattle
Alabama	25,498.00	- 0 -	48,000.00	34,544.00
Arkansas	7,000.00	- 0 -	52,128.00	43,271.07
Florida	3,570.00	- 0 -	166,058.00	189,497.00
Georgia	6,250.00	4,940.00	20,000.00	28,481.49
Kentucky	34,957.00	27,175.00	- 0 -	19,010.00
Louisiana	16,945.00	- 0 -	86,610.00	29,713.80
Mississippi	12,900.00	- 0 -	20,000.00	30,000.00
North Carolina	11,000.00	1,800.00	60,000.00	30,600.00
South Carolina	7,503.92	- 0 -	23,103.00	26,418.00
Tennessee	10,000.00	10,700.00	47,500.00	- 0 -
Texas	28,680.00	28,421.00	125,460.00	66,418.70
Virginia	27,930.00	6,100.00	43,452.00	18,000.00
Brooksville, Florida	- 0 -	74,450.84	70,566.68	66,739.73
Jeanerette. Louisiana	9,000.00	51,582.27	116,207.28	30,786.88
Front Royal, Virginia	- 0 -	74,239.00	111,298.00	37,763.00



## STATE REPORTS



AUBURN UNIVERSITY  
Agricultural Experiment Station  
Auburn, Alabama

I. PROJECT: Hatch 219 (S-10)

The Effect of Environment, Genetic-Environmental Interaction and Heterosis on Performance of Beef Cattle.

II. OBJECTIVES:

To evaluate the effect of environment and genetic environmental interaction on genetic progress under phenotypic selection.

To determine the effectiveness of selection for total performance in beef cattle.

To determine the influence of heterosis on rate of gain carcass quality and cow performance.

III. PERSONNEL:

T. B. Patterson and G. B. Meadows

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope and nature of work

The purebred Angus and Hereford herds have been divided into similar groups. Line I Angus and Line I Hereford have been designated the high nutritional groups. Line II Angus and Line II Hereford have been designated as the low nutritional herds. Selection by index for replacements will be on a within group basis.

The crossbreeding study is in its final phase. Cows have been bred for the last calf crop which will be dropped this winter.

2. Research results

No results are available on the genetic-environmental interaction portion of the study. The first calf crop under the two regimes are being weaned at the present time.

A summary of the performance of the two groups of crossbred calves from birth to weaning are shown in Table I.

TABLE 1. SUMMARY-TWO BREED VS THREE BREED CROSS CALVES FROM BIRTH TO WEANING-FIVE YEARS

	Two Breed Crosses	Three Breed Crosses	Difference
No. of calves	127	159	
Av. birth wt., lb.	64.6	66.2	1.6
Av. adj. weaned wt., lb.	460.3	478.0	17.7
Av. slaughter score <u>1</u> /	9.3	9.5	0.2

1/ 10-Good; 13-Choice

These differences have been of the same magnitude and favoring the three-breed cross calves in each of the five years.

A five year summary of the post-weaning performance for the heifers is shown in Table 2.

TABLE 2. SUMMARY-TWO BREED VS THREE BREED CROSS HEIFERS POSTWEANING-FIVE YEARS.

	Two Breed Crosses	Three Breed Crosses	Difference
No. of heifers	69	66	
Av. gain on test 120 days, lb.	205.8	212.6	6.8
Av. Final wt., lb.	673.0	698.3	25.3
Av. wt./day age, lb.	1.51	1.56	0.05
Av. Final breeder score <u>1</u> /	12.2	12.3	0.1

1/ 10-Good; 13-Choice

The difference of 25 pound in favor of the three-breed crosses is for the most part a reflection of differences at the beginning of the test period. These heifers were full-fed a 70 per cent roughage ration for 120 day.

A four year summary of the post-weaning performance and carcass data for the steers is presented in Table 3. The small differences favoring the two-breed cross steers in the feed lot has been consistant. No significant differences have been noted in any carcass measurement recorded.

TABLE 3. SUMMARY-TWO BREED VS. THREE BREED CROSS STEERS POST-WEANING  
AND CARCASS DATA-FOUR YEARS.

	Two Breed Crosses	Three Breed Crosses	Difference
No. of steers	36	69	
Av. final wt. shrunk lb.	991.5	993.3	
Av. no. days in feed lot, days	297.8	302.7	4.9
Av. daily gain on feed, lb.	1.87	1.78	0.09
Av. carcass grade <u>1</u> /	13.9	14.0	0.1
Av. adjusted rib-eye area/cwt. sq. in.	1.88	1.94	0.06
Av. Fat thickness, in.	0.75	0.78	0.03
Av. W. B. Shear lb. / sq. in. <u>2</u> /	15.22	14.20	1.02

1/ 13-Choice; 14-High Choice

2/ 10-14-Very Tender; 15- 19 moderately tender

#### V. FUTURE PLANS:

The project will be continued on the present basis.

#### VI. PUBLICATIONS DURING THE YEAR:

Summary Beef Cattle Performance Test

Relationship of Performance Records to Sale Price of Tested Bulls. Highlights  
of Agri. Res. Vol. 14, No. 2, Summer 1967.

#### VII. PUBLICATIONS PLANNED:

None

Submitted by: Troy B. Patterson



## I. PROJECT: Animal Science 4-016

A Comparison of Crossbreeding and Within Breed Selection on Beef Cattle Production in the Black Belt Area of Alabama

## II. OBJECTIVES:

To evaluate the significance of hybrid vigor in various crosses of beef cattle with regard to production of slaughter calves, stocker or feeder steers and slaughter steers.

## III. PERSONNEL:

T. B. Patterson, L. A. Smith and Harold Grimes

## IV. ACCOMPLISHMENTS DURING THE YEAR:

## 1. Scope and nature of work

Seventy-five brood cows (18 Hereford, 26 Angus-Hereford and 26 Brahman-Hereford) are devoted to this study. Data collected include weaned weights and grades on all calves, and postweaning performance and carcass information on all steer calves.

## 2. Research Results

The final set of calves which will conclude project 4-016 is on the ground.

Data for six complete years from birth to weaning are presented in Table 1.

TABLE 1. SUMMARY CROSSBREEDING RESULTS SIX YEAR AVERAGE  
BLACK BELT SUBSTATION:

	Breed Composition of Calves			
	Hereford	3/4 Hereford 1/4 Angus	3/4 Angus 1/4 Hereford	7/8 Hereford 1/8 Brahman
No. of calves	91	61	59	116
Corrected weaned wt., lb.	457	516	506	483
Corrected av. daily gain, lb.	1.53	1.77	1.74	1.64
Slaughter grade	9.7	10.7	10.7	9.7
Stocker grade	11.8	12.2	12.2	11.3
% calf crop weaned	88.0	93.8	88.1	89.5

The advantage at weaning for the crossbreds over the Hereford controls is 59, 48, and 26 pounds respectively for  $3/4$  Hereford  $1/4$  Angus,  $3/4$  Angus  $1/4$  Hereford and  $7/8$  Hereford  $1/8$  Brahman. The back/cross calves ( $3/4$  Hereford  $1/4$  Angus and  $3/4$  Angus  $1/4$  Hereford) graded slightly higher than the Hereford and  $1/8$  Brahman calves.

Five years have been completed for the steer calves on a post-weaning program. These data are presented in Table 2.

TABLE 2. SUMMARY PASTURE AND FEED LOT PERFORMANCE FIVE YEAR AVERAGE BLACK BELT SUBSTATION:

	Hereford	Breed Composition of Steers		
		$3/4$ Hereford $1/4$ Angus	$3/4$ Angus $1/4$ Hereford	$7/8$ Hereford $1/8$ Brahman
No. of steers	34	14	16	40
No. days on pasture	85	79	90	90
Av. daily gain on pasture, lb.	1.76	1.62	1.51	1.73
Cost per cwt. gain \$	14.12	14.30	17.70	13.81
No. days in feed lot	145	145	145	145
Av. daily gain feed lot, lb.	2.36	2.36	2.20	2.22
Cost per cwt. gain, \$	22.95	24.34	26.39	25.12
Av. final shrunk wt., lb.	980	1008	1000	996

The steers were fed on pasture for approximately 85 days and then full-fed in the feed lot for an additional 145 days. Compensatory gain is indicated for the growth period on pasture. The Hereford and  $7/8$  Hereford steers gained faster than the black-cross steers. This better performance is reflected in a slightly lower cost per cwt. gain. However, all groups performed at acceptable levels and were very efficient. Feed lot performance indicates that the Hereford and  $3/4$  Hereford  $1/4$  Angus steers gained 0.15 pounds per day faster than the other groups. Feed efficiency also favors the faster gaining steers. At the end of the feed lot period, final shrunk average weights still favored the back-cross calves. However, these differences over the Hereford controls were 28, 20 and 16 pounds respectively for the  $3/4$  Hereford,  $3/4$  Angus and  $1/8$  Brahman steers.

Only small differences in carcass data were noted, Table 3.

TABLE 3. SUMMARY SLAUGHTER DATA FIVE YEAR AVERAGE-BLACK BELT SUBSTATION.

	Hereford	Breed Composition of Calves		
		3/4 Hereford 1/4 Angus	3/4 Angus 1/4 Hereford	7/8 Hereford 1/8 Brahman
No. of steers	34	14	16	40
Av. Final Shrunk wt., lb.	980	1008	1000	996
Dressing %	58.6	59.2	61.0	60.4
Carcass grade, federal <u>1</u> /	11.3	11.7	12.4	10.8
Fat thickness, in.	0.49	0.51	0.68	0.53
Rib-eye area/cwt. sq. in.	2.01	2.72	2.07	2.06
Yield grade <u>2</u> /	3.15	2.72	3.24	2.95

1/ 10-Good, 11-High Good, 12-Low Choice, 13-Choice  
2/ 3 year average

The 3/4 Angus steers were fatter with 0.68 in. fat over the rib as compared to 0.50 for the other three groups.

V. FUTURE PLANS:

This project will be terminated on June 30, 1968.

VI. PUBLICATIONS DURING THE YEAR:

None

VII. PUBLICATIONS PLANNED:

Crossbreeding Beef Cattle in the Black Belt Area of Alabama

Submitted by: Troy B. Patterson



I. PROJECT: Animal Science 4-017

The Effects of Breed and Breed Crosses on Milk Production and on Other Production Factors in a Grade Beef Herd.

II. OBJECTIVES:

To determine the effect of Brown Swiss, Holstein and Charolais breeding on (a) milk production, (b) weaning weights and grades, (c) feedlot performance, and (d) carcass desirability.

To evaluate methods of increasing milk production in a grade beef herd through use of selected bulls from different breeds.

III. PERSONNEL:

T. B. Patterson, W. W. Cotney and R. A. Moore

IV. ACCOMPLISHMENTS DURING THE YEAR:

1. Scope and nature of work

Seventy-five grade Hereford cows were divided into similar groups of 25 each on the basis of age, breeding, and previous production record. They were bred to Hereford (control), Brown-Swiss, and Charolais bulls. The bulls have been changed each year and the cows redivided to minimize sampling differences. In addition, grade Holstein cows have been bred to the Hereford control bulls to produce a fourth group of calves.

The females thus produced will serve as foundation stock for the project. The foundation females will be backcrossed to Hereford bulls selected from known high milking dams. Milk production, weaning weights, and grades will be determined for each generation (three generations of backcrosses). In addition, post-weaning performance and carcass information will be obtained.

2. Research results:

The first phase of this study has been completed. Three groups of calves have been carried through the weaning and pasture period and three groups of steers have been finished in the feed lot and carcass data obtained. All physically sound heifers from the four breeding groups have been retained and matings have been made to produce the first calf crop of the second phase.

Data for the three groups of calves through the weaning and pasture periods are presented in Table 1.

TABLE 1. SUMMARY CALF PERFORMANCE THREE YEAR AVERAGE-UPPER COASTAL PLAIN SUBSTATION.

	Hereford	Breeding Group	
		Charolais Cross	Brownswiss Cross <sup>1/</sup>
No. of calves	64 <sup>2/</sup>	60 <sup>3/</sup>	39
Av. % calf crop weaned	86.5	87.0	95.3
Adjusted weaned wt., lb.	454.0	490.0	466.5
Slaughter grade	9.3	9.5	7.8
Av. days on pasture	95.6	96.4	74.5
Av. gain on pasture, lb.	68.7	104.5	80.3
Av. final wt., lb.	527.4	589.3	543.5

<sup>1/</sup> Two year Av. Brown Swiss bull sterile 1st. year.<sup>2/</sup> Two calves died on pasture<sup>3/</sup> One calf died on pasture

The Charolais cross calves were 36 lbs. heavier at weaning than the Hereford calves and 24 lbs. heavier than the Brown Swiss cross calves. The Charolais cross calves also gained faster on pasture than the other two groups.

Feed lot and carcass data for the steer calves are given in Table 2.

TABLE 2. SUMMARY FEED LOT AND SLAUGHTER DATA THREE YEAR AVERAGE-UPPER COASTAL PLAIN SUBSTATION.

	Hereford	Breeding Group	
		Charolais Cross	Brown Swiss Cross <sup>1/</sup>
No. of steers	37	34	21
Av. initail wt., lb.	546.5	622.2	558.8
Av. final shrunk wt., lbs.	947.1	1007.5	975.2
Av. daily gain, lbs. (174 days)	2.31	2.25	2.30
Av. wt./day of age., lbs.	1.83	1.92	1.87
Av. chilled carcass wt., lbs.	545.0	591.1	554.4
Av. carcass grade, federal	12.0	11.0	10.5
Av. rib-eye area/cwt., sq. in.	2.07	2.36	2.06
Av. fat over rib, in.	0.38	0.19	0.23
Av. yield grade	2.89	1.90	2.54
Av. tenderness, lb./sq. in <sup>2/</sup>	17.14	16.26	18.07

<sup>1/</sup> Two years<sup>2/</sup> 10-14 very tender; 15-19 moderately tender

There were no differences among the three breeding groups with respect to gain in the feed lot. However, the Charolais cross steers were heaviest at slaughter and had the heaviest carcasses. The Charolais cross carcasses had less fat, larger rib-eye, better yield grades and were slightly more tender than the Hereford or Brown Swiss cross calves. Primarily because of a higher degree of marbling, the Hereford steers graded higher.

V. FUTURE PLANS:

The project will be continued as outlined.

VI. PUBLICATIONS DURING THE YEAR:

None

VII. PUBLICATIONS PLANNED:

A popular type report on the first phase of this study.

Submitted by: Troy B. Patterson



## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Alabama

Location		Auburn	Auburn	Auburn	Auburn	Auburn
Breed of Sire		Angus	Angus	Hereford	Hereford	Angus
Breed of Dam		Angus	Angus	Hereford	Hereford	Hereford
Line or Group <sup>1</sup>		Line I	Line II	Line I	Line II	Cross-breeding
Percent used in project		100 %	100%	100 %	100%	100 %
Inventory as of July 1, 1967	Cows 2 years and over	43	43	38	39	9
	Yearling heifers	9	10	9	9	0
	Bulls and steers under 1 year	18	11	20	18	0
	Heifers under 1 year	14	20	13	17	4
	Bulls over 1 year	3	3	7	7	0
	Steers over 1 year	0	0	0	0	0
Repro. Perf.	Percent pregnant <sup>2</sup>	72.3 <sup>1/</sup>	75.0 <sup>1/</sup>	86.8	95.1	44.4 <sup>2/</sup>
	Calf survival percent <sup>3</sup>	94.1	88.8	96.9	92.3	100.0
Wean. Perf.	Adj. ADG. <sup>4</sup>	1.69	1.66	1.43	1.46	1.62
	Av. type sc. <sup>5</sup>	12.5	12.1	11.9	12.0	11.6
Postweaning Performance	No. of bulls	8	9	10	12	0
	No. of heifers	15	10	14	10	5
	No. of steers	0	0	0	0	2
Slaughtered	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	No. of steers	0	0	0	0	2
Remarks		1/ Two of 4 bulls used had Trichomoniasis. 2/ One of 2 bulls used had Trichomoniasis.				

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustment: Mature dam, steer equivalent.

5 - Suggest S-10 scoring system; indicate if different.

## Production, Inventory and Performance Data, S-10 Herds - 1966-1967

State Alabama

Location		Auburn	Auburn	Auburn	Auburn	Auburn	Auburn
Breed of Sire		Angus	Hereford	Hereford	Shorthorn	Shorthorn	Angus
Breed of Dam		Shorthorn	Angus	Shorthorn	Angus	Hereford	Hereford X Shorthorn
Line or Group <sup>1</sup>		Cross-breed	Cross-breeding	Cross-breeding	Cross-breeding	Cross-breeding	Cross-breeding
Percent used in project		100 %	100 %	100 %	100 %	100 %	100%
Inventory as of July 1, 1967	Cows 2 years and over	9	9	9	9	9	12
	Yearling heifers	0	0	0	0	0	0
	Bulls and steers under 1 year	0	5	2	2	2	4
	Heifers under 1 year	3	4	4	3	4	6
	Bulls over 1 year	0	0	0	0	0	0
	Steers over 1 year	0	0	0	0	0	0
	Percent pregnant <sup>2</sup>	33.3 <sup>2/</sup>	100.0	77.8	66.7 <sup>2/</sup>	66.7 <sup>2/</sup>	83.3 <sup>2/</sup>
Repro. Perf.	Calf survival percent <sup>3</sup>	100.0	100.0	85.7	83.3	100.0	100.0
Wean. Perf.	Adj. ADG <sup>4</sup>	1.46	1.80	1.77	1.59	1.58	1.54
	Av. type sc. <sup>5</sup>	11.0	11.5	11.6	11.7	10.4	10.8
Postweaning Performance	No. of bulls	0	0	0	0	0	0
	No. of heifers	2	4	3	5	2	3
	No. of steers	5	5	5	1	3	5
Slaughtered	No. of bulls	0	0	0	0	0	0
	No. of heifers	0	0	0	0	0	0
	No. of steers	5	5	5	1	3	5
Remarks <sup>2/</sup> One of two bulls used had Trichomoniasis							

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustment: Mature dam, steer equivalent.

5 - Suggest S-10 scoring system; indicate if different.



State Alabama

Location		Auburn	Auburn	Auburn	Auburn	Auburn
Breed of Sire		Angus	Hereford	Hereford	Shorthorn	Shorthorn
Breed of Dam		Shorthorn x Hereford	Angus X Shorthorn	Shorthorn X Angus	Angus X Hereford	Hereford X Angus
Line or Group <sup>1</sup>		Cross- breeding	Cross- breeding	Cross- breeding	Cross- breeding	Cross- breeding
Percent used in project		100 %	100 %	100 %	100 %	100 %
Inventory as of July 1, 1967	Cows 2 years and over	11	10	12	11	14
	Yearling heifers	0	0	0	0	0
	Bulls and steers under 1 year	1	3	3	3	3
	Heifers under 1 year	5	6	6	3	3
	Bulls over 1 year	0	0	0	0	0
	Steers over 1 year	0	0	0	0	0
Repro. Perf.	Percent pregnant <sup>2</sup>	58.3 <sup>2/</sup>	90.9	83.3	54.5 <sup>2/</sup>	50.0 <sup>2/</sup>
	Calf survival percent <sup>3</sup>	85.7	90.0	90.0	100.0	85.7
Wean. Perf.	Adj. ADG <sup>4</sup>	1.71	1.77	1.75	1.81	1.62
	Av. type sc. <sup>5</sup>	11.5	11.6	11.2	12.7	11.0
Postweaning Performance	No. of bulls	0	0	0	0	0
	No. of heifers	3	6	5	3	0
	No. of steers	3	4	7	0	5
Slaughtered	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	No. of steers	3	4	7	0	5
Remarks <u>2/</u> One of 2 bulls used had Trichomoniasis						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustment: Mature dam, steer equivalent.

5 - Suggest S-10 scoring system; indicate if different.

Production, Inventory, and Performance Data, S-10 Herds 1966-1967

State Alabama

Location		Black Belt Substation	Black Belt Substation	Black Belt Substation	Black Belt Substation	
Breed of Sire		Hereford	Hereford	Hereford	Angus	
Breed of Dam		Hereford	3/4 Hereford 1/4 Brahman	1/2 Angus 1/2 Hereford	1/2 Angus 1/2 Hereford	
Line or Group <sup>1</sup>		Cross-breeding	Cross breeding	Cross breeding	Cross breeding	
Percent used in project		100 %	100 %	100 %	100 %	
Inventory as of July 1, 1967	Cows 2 years and over	17	19	13	12	
	Yearling heifers	0	0	0	0	
	Bulls and steers under 1 year	3	13	6	1	
	Heifers under 1 year	12	6	11	4	
	Bulls over 1 year	2	0	0	1	
	Steers over 1 year	0	0	0	0	
Repro. Perf.	Percent pregnant <sup>2</sup>	94.1	100.0	100.0	62.5	
	Calf survival percent <sup>3</sup>	93.7	100.0	100.0	100.0	
Mean. Perf.	Adj. ADG <sup>4</sup>	1.53	1.64	1.77	1.74	
	Av. type sc. <sup>5</sup>	11.8	11.3	12.2	12.2	
Postweaning Performance	No. of bulls	0	0	0	0	
	No. of heifers	0	0	0	0	
	No. of steers	10	8	10	3	
Slaughtered	No. of bulls	0	0	0	0	
	No. of heifers	0	0	0	0	
	No. of steers	10	8	10	3	
Remarks						

- 1 - Purebreds, grade, line, sire number, crosses, treatment, etc.
- 2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.
- 3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.
- 4 - Indicate adjustment: Mature dam, steer equivalent.
- 5 - Suggest S-10 scoring system; indicate if different.



State Alabama

Location		Winfield Substation	Winfield Substation	Winfield Substation		
Breed of Sire		Hereford	Charolais	Brown Swiss		
Breed of Dam		Grade Hereford	Grade Hereford	Grade Hereford		
Line or Group <sup>1</sup>		Cross breeding	Cross breeding	Cross breeding		
Percent used in project		100 %	100 %	100 %		
Inventory as of July 1, 1967	Cows 2 years and over	0	0	0		
	Yearling heifers	31	26	19		
	Bulls and steers under 1 year	0	0	0		
	Heifers under 1 year	0	0	0		
	Bulls over 1 year	2	1	1		
	Steers over 1 year	0	0	0		
Repro. Perf.	Percent pregnant <sup>2</sup>	85.7	91.3	89.5		
	Calf survival percent <sup>3</sup>	100.0	95.2	100.0		
Wean. Perf.	Adj. ADG <sup>4</sup>	1.61	1.77	1.67		
	Av. type sc. <sup>5</sup>	12.2	12.2	9.4		
Postweaning Performance	No. of bulls	0	0	0		
	No. of heifers	7	7	8		
	No. of steers	11	12	9		
Slaughtered	No. of bulls	0	0	0		
	No. of heifers	0	0	0		
	No. of steers	11	12	9		
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustment: Mature dam, steer equivalent.

5 - Suggest S-10 scoring system; indicate if different.

UNIVERSITY OF ARKANSAS  
Agriculture Experiment Station  
Fayetteville, Arkansas

I. PROJECT:

Improvement of Beef Cattle for the Southern Region Through Breeding Methods - Arkansas Hatch 170 - Evaluation of Performance Records of Beef Cattle

II. OBJECTIVES:

Continue to develop practical but adequate methods for identifying, evaluating, and propagating the genetic potential for the production of beef.

III. PERSONNEL:

Brown, C. J., R. S. Honea, and F. Scaramuzza

IV. ACCOMPLISHMENTS DURING THE YEAR:

Improvement of facilities has continued with the clearing of brush and seedling of about 100 acres of additional pasture. Data were collected in accordance with the long-range objectives of the project. These data include routine weights and body measurements with steel tape and caliper, the post-weaning performance testing of bulls and lifetime performance records of cows. Carcass data and eating quality scores were obtained on the bulls that were slaughtered.

In a companion State project under which bulls are fed for cooperating breeders, 120 bulls were individually fed at three locations in the State. In addition to the annual summary of the performance of these bulls, an analysis of four year's data was completed and published. This least squares analysis determined the effects of initial age, initial weight, initial condition, year, location, and breed on six performance traits.

A bulletin summarizing observations of a founder-like foot anomaly in a herd of Hereford cattle was completed. The condition produces clinical signs similar to founder. Higher blood calcium levels, calcium deposits in the testicles and kidneys, and atrophy of the parathyroid were associated with this defect. The frequency of occurrence in a closely related group of cattle suggests a genetic basis.

A masters thesis concerned with factors affecting birth weight was completed.



## V. FUTURE PLANS:

Continue routine observations and herd records. Complete analysis of data from station performance tests.

## VI. PUBLICATIONS DURING THE YEAR:

Brown, C. J., J. D. Roussel and O. T. Stallcup. 1967. Observations of a "founder-like" anomaly in a group of Hereford cattle. Ark. Agr. Expt. Sta. Bul. 724. Also J. Animal Sci. 26:201 (abst.).

Brown, C. J., Carl Lueker, Curtis Melton, W. T. Wallace, Robert Parham, R. S. Honea and M. L. Ray. 1967. Four year's of beef bull performance testing at central testing stations. Ark. Agr. Expt. Sta. Bul. 725.

Melton, C. C., C. J. Brown, P. K. Lewis, Jr. and M. C. Heck. 1967. Beef bull performance and secondary sex characteristics. J. Animal Sci. 26: 244-249. Also J. Animal Sci. 24:282 (abst.).

Galvez, Victor. 1966. Factors affecting the birth weight of beef calves. Master's Thesis, University of Arkansas Library.

Melton, C. C., C. J. Brown, Carl Lueker, W. T. Wallace, Cecil Bittle, Robert Parham, R. S. Honea and M. L. Ray. 1967. The influence of age, weight, and condition at the beginning of test on beef bull performance. Ark. Animal Sci. Res. Conf., pp. 9-11.

Brown, C. J., R. S. Honea and Frank Scaramuzza. 1967. Genetic and environmental relationships among performance traits of beef bulls. Ark., Animal Sci. Res. Conf., pp. 24-26.

Scaramuzza, F., R. S. Honea and C. J. Brown. 1967. Weight and body dimensions of heifers pregnant vs. non-pregnant from first breeding season. Ark. Animal Sci. Res. Conf., pp. 33-34

Brown, C. J. 1967. Crossbreeding study with beef cattle initiated. Ark. Farm Res., pp. 5



## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Arkansas

Location	Fayetteville	Fayetteville			
Breed of sire	Hereford	Angus			
Breed of dam	Hereford	Angus			
Line or Group <sup>1</sup>	Purebred	Purebred			
Percent used in project	100	100			
Inventory as of July 1, 1967	Cows 2 years and over	133	219		
	Yearling heifers	42	59		
	Bulls and steers under 1 year	39	87		
	Heifers under 1 year	52	71		
	Bulls over 1 year	32	40		
	Steers over 1 year	0	0		
Repro. Perf.	Percent <sup>2</sup> pregnant	88.0	85.4		
	Calf survival percent <sup>3</sup>	93.96	94.41		
Wean. Perf.	Adj. ADG <sup>4</sup>	1.23	1.27		
	Av. type sc. <sup>5</sup>	12	12		
Postweaning performance	No. of bulls	17	32		
	No. of heifers	16	27		
	No. of steers	0	0		
Slaughtered	No. of bulls	11	18		
	No. of heifers	0	0		
	No. of steers	0	0		
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: Adjustment for sex and dam's lactation minus birth weight.

S-10-1 5 - Suggest S-10 scoring system: indicate if different.

UNIVERSITY OF FLORIDA  
Agriculture Experiment Station  
Gainesville, Florida

PROJECT: 1003

Inherent body size in cattle as related to adaptation to Florida's climatic environment.

OBJECTIVES:

To determine the performance of three different groups of beef cattle selected respectively for:

- (a) Large skeletal and body size
- (b) Adaptation to Florida climate as reflected in thrift and vitality, and
- (c) The combination of weight and grade to give the greatest economic returns per animal unit.

PERSONNEL: M. Koger, F. S. Baker, and A. C. Warnick

ACCOMPLISHMENTS:

Three groups of 250 cows each are being used in a selection experiment. One group is being selected for large skeletal size to determine the effect this trait has on adaptability to Florida. Another group is being selected for indications of adaptability, measured mainly by condition score to determine whether animals selected for this trait tend toward any particular size. The third group serves as a control. The project has not been under way long enough for the groups to become distinct.

FUTURE PLANS:

Continue project as outlined.

PUBLICATIONS: None

PUBLICATIONS PLANNED: None



UNIVERSITY OF FLORIDA  
Agricultural Experiment Station  
Gainesville, Florida

PROJECT: 627 (Revised)

Pasture programs and cattle breeding systems for beef production on flat-woods soil of Northcentral Florida.

OBJECTIVES:

- (1) To determine the relative cost of three pasture programs for beef production with a cow-calf operation.
- (2) To compare the effectiveness of four different breeding systems in improving the production of beef cattle.
- (3) To evaluate systems for growing heavy calves to market weight and grade.

PERSONNEL:

M. Koger, W. G. Blue, G. B. Killinger, J. M. Myers and R. E. L. Greene

ACCOMPLISHMENTS:

Two hundred ten females of breeding age were used during 1965-66 in evaluating four breeding programs which were initiated in 1952 with a foundation of Brahman-Native females:

- (1) Upgrading to British sire (Angus and Hereford)
- (2) Crisscrossing Angus and Hereford
- (3) Crisscrossing Angus and Brahman
- (4) Crisscrossing Hereford and Santa Gertrudis

Weaning data from the 1966 calf crop are presented in form S-10-1.

The data from 5 years (1960-64) were analyzed in preparation for publication. The average production per cow for the four groups above considering both weaning weight of calves and weaning percent was 451, 493, 428, and 476 lbs., respectively.

FUTURE PLANS:

Present procedures will be continued until blood composition becomes stable enough to evaluate the programs. The data from feeding steers produced in the four programs will be summarized for presentation.

PUBLICATIONS: None

PUBLICATIONS PLANNED:

Station bulletin summarizing data from 1960-1964 in press.

EVERGLADES EXPERIMENT STATION  
Belle Glade, Florida

PROJECT: 990

Breeding beef cattle for adaption to South Florida conditions.

OBJECTIVES:

(1) To compare the performance of progeny from Angus, Brahman and Hereford cattle, and from three possible two-breed rotational crosses of these breeds for beef production in the South Florida area.

(2) To develop through selection Angus and Hereford cattle which will be adapted to South Florida conditions.

PERSONNEL: R. W. Kidder, Dan Beardsley and C. E. Haines

ACCOMPLISHMENTS:

There were 353 females bred in the project. There are six different breeding groups including Angus, Brahman, Hereford and the three possible two-breed rotation crosses utilizing purebred bulls mated to crossbred cows. Representative straight bred and crossbred cows, along with their calves were fed under controlled conditions for the second year to determine efficiency of feed conversion by producing cows. The weaning data from the 1965 calf crop are shown in form S-10-1.

FUTURE PLANS:

Continue the project as outlined. Representative steers from the different breed groups will be evaluated in grazing and feedlot trails.

PUBLICATIONS: None

PUBLICATIONS PLANNED:

Preliminary results from crossbreeding with Angus, Brahman and Hereford cattle.

Feed conversion by crossbred and straightbred cows.

EVERGLADES EXPERIMENT STATION  
Belle Glade, Florida

PROJECT: 922

Angus, Brangus, and Angus x Brangus crossbreds for beef production in the Everglades area.

OBJECTIVES:

(1) To compare the performance of straightbred Angus and Brangus cattle with rotation crosses of the two breeds for beef production in the Everglades area.

(2) To develop a highly productive herd of cattle at the State Prison Farm through selection based on production testing.

PERSONNEL:

M. Koger, R. W. Kidder and Dan Beardsley

ACCOMPLISHMENTS:

There were 1408 females of breeding age in the project. Blood composition has not yet stabilized to the point that the performance of different breed groups can be evaluated.

FUTURE PLANS:

Continue groups until blood composition in the various breed groups stabilizes and performance can be evaluated.

PUBLICATIONS: None

PUBLICATIONS PLANNED: None



RANGE CATTLE STATION  
Ona, Florida

PROJECT: 615 (Revised)

Influence of breed composition and level of nutrition on adaptability of cattle to Central Florida conditions.

OBJECTIVES:

To determine the relative productivity of cows with different proportions of British and Brahman blood when run under pasture conditions designed to supply low, medium and good nutrition levels.

PERSONNEL: F. M. Peacock, H. L. Chapman and M. Koger

ACCOMPLISHMENTS:

For the fourteenth year, cows of Brahman (B), Shorthorn (S),  $1/2B\ 1/2S$ ,  $3/4B\ 1/4S$ , and  $1/4B\ 3/4S$  were maintained on three nutrition levels and production performance compared. The project involved 194 cows 2 years of age and older. The production performance for 1965 is summarized in form S-10-1.

FUTURE PLANS:

The data obtained during 1966 completed this study. The data is being analyzed and results published. The project is closed effective July 1, 1967.

PUBLICATIONS FOR YEAR: None

PUBLICATIONS PLANNED:

The data will be published probably in bulletin form.

RANGE CATTLE EXPERIMENT STATION  
Ona, Florida

PROJECT: 1120

Charolais, Brahman, Angus and their crosses for beef production in South Florida.

OBJECTIVES:

To evaluate the relative productivity of Charolais, Brahman, Angus and their crosses for beef production in South Florida.

PERSONNEL:

F. M. Peacock, E. M. Hodges, H. L. Chapman and M. Koger

ACCOMPLISHMENTS:

Angus, Brahman and Charolais bulls are being mated to females of the same breeds in all possible combinations to produce straightbred and crossbred progeny. The three groups of  $F_1$  females likewise will be mated to the three breeds of bulls to produce backcross and three-breed cross progeny. A minimum of 90 straightbred females (10 per Subgroup) are bred each year. A comparable number of crossbred females will be added to the project as they are produced. The post-weaning and feedlot performance of progeny produced in the trail are evaluated in a companion study. The second calf crop was weaned in 1965. The data are summarized in form S-10-1.

FUTURE PLANS:

Continue project as outlined.

PUBLICATIONS: None

PUBLICATIONS PLANNED: None

NORTH FLORIDA EXPERIMENT STATION  
Quincy, Florida

I. PROJECT: 1180

Selection of replacement females in beef cattle.

II. OBJECTIVES:

To compare genetic progress and economic returns from selecting replacement on their own calfhoo performance versus selection on the basis of production records.

III. PERSONNEL:

F. S. Baker, Jr. and M. Koger

IV. ACCOMPLISHMENTS DURING THE YEAR:

This is a new project and the 1967 calf crop will represent the second year's production following the initiation of the selection procedures outlined for females. The weaning data from the 1965 calf crop is summarized in form S-10-1.

V. FUTURE PLANS:

Continue project as outlined.

VI. PUBLICATIONS: None

VII. PUBLICATIONS PLANNED:

None



## Production, Inventory, and Performance Data, S-10 Herds

State Florida

Location	Belle Glade	Belle Glade	Belle Glade	Belle Glade	Belle Glade	Belle Glade
Breed of sire	Angus	Brahman	Hereford	A, B	A, H	B, H
Breed of dam	Angus	Brahman	Hereford	Crisscross	Crisscross	
Line or group <sup>1</sup>	Angus	Brahman	Hereford	A, B Crisscross	A, H Crisscross	B, H Crisscross
Percent used in project	75	75	75	75	75	75
Inventory as of July 1	Cows 2 years and over	35	38	39	68	76
	Yearling heifers	10	9	14	21	18
	Bulls and steers under 1 year	8	16	17	20	25
	Heifers under 1 year	14	15	10	33	40
	Bulls over 1 year	5	4	2		
	Steers over 1 year					
Repro. perf.	Percent prenatant <sup>2</sup>	94	89	100	96	97
	Calf survival percent <sup>3</sup>	73	100	95	98	91
Wean. perf.	Adj. ADG <sup>4</sup>	1.51	1.80	1.59	1.92	1.61
	Av. type sc. <sup>5</sup>	10.1	10.3	10.8	11.0	10.9
Postweaning performance	No. of bulls					
	No. of heifers	10	9	14	21	18
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system: indicate if different.



Production, Inventory, and Performance Data, S-10 Herds

State Florida

Location		Range Cattle Station	Range Cattle Station	Range Cattle Station	Range Cattle Station	Range Cattle Station	Range Cattle Station
Breed of sire		Angus (A)	Brahman (B)	Charolais	A, B	A, C	B, C
Breed of dam		A	B	C	B, A	C, A	C, B
Line or group <sup>1</sup>		Purebred	Purebred	Grade	Reciprocal Crossbreds	Reciprocal Crossbreds	Reciprocal Crossbreds
Percent used in project		100	100	100	100	100	100
Inventory as of July	Cows 2 years and over	10	13	10	20	22	21
	Yearling heifers						
	Bulls and steers under 1 year	3	4	2	6	6	9
	Heifers under 1 year	6	4	5	6	8	9
	Bulls over 1 year	1	1	1	a	a	a
	Steers over 1 year						
Repro perf.	Percent Pregnant <sup>2</sup>	87	91	95	62	96	78
	Calf survival percent <sup>3</sup>	92	100	92	92	88	76
Wean. perf.	Adj. ADG <sup>4</sup>	1.56	1.76	2.10	1.93	1.97	2.04
	Av. type sc. <sup>5</sup>	10.6	10.6	11.6	11.6	12.3	10.8
Postweaning performance	No. of bulls	0	1	1	0	0	0
	No. of heifers	6	4	5	6	8	9
	No. of steers	3	3	1	6	6	9
Slaughtered	No. of bulls						
	No. of heifers						
	No. of steers	3	3	1	6	6	9
Remarks							

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: None

5 - Suggest S-10 scoring system: indicate if different.

S-10-1 a. Combined with straightbreds



Location	Range Cattle Station	Range Cattle Station	Range Cattle Station	Range Cattle Station	Range Cattle Station	Range Cattle Station
Breed of sire	Shorthorn	Shorthorn	Shorthorn	Shorthorn	Shorthorn	Shorthorn
Breed of dam	Brahman	3/4B 1/4S	1/2B 1/2S	1/2B 1/2S	1/4B 3/4S	Shorthorn
Line or group <sup>1</sup>						
Percent used in project	100	100	100	100	100	100
Inventory as of July 1	Cows 2 years and over	27	32	25	24	30
	Yearling heifers	7	10	7	7	9
	Bulls and steers under 1 year	10	16	12	11	14
	Heifers under 1 year	10	14	13	12	12
	Bulls over 1 year	1	1	1	1	1
	Steers over 1 year					
Repro. perf.	Percent pregnant <sup>2</sup>	71	79	81	77	90
	Calf survival percent <sup>3</sup>	100	100	100	100	92
Wean. perf.	Adj. ADG <sup>4</sup>	1.74	1.62	1.76	1.87	1.84
	Av. type sc. <sup>5</sup>	11.1	10.9	11.7	11.0	11.0
Postweaning performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system. indicate if different.



## Production, Inventory, and Performance Data, S-10 Herds

State Florida

Location	Quincy	Quincy	Raiford	Belle Glade	Brighton	
Breed of sire	Angus	Angus	Angus	Angus Brangus	Hereford	
Breed of dam	Angus	Angus	Gr. Angus	A,By,Axby	Grade H	
Line or group <sup>1</sup>	Control	Culled	Combined <sup>a</sup>	Combined <sup>a</sup>	Combined <sup>a</sup>	
Percent used in project	50	50	100 <sup>b</sup>	100 <sup>b</sup>	100 <sup>b</sup>	
Inventory as of July 1	Cows 2 years and over	42	48	964	1408	308
	Yearling heifers	22	15	316	507	85
	Bulls and steers under 1 year	11	17	355	434	77
	Heifers under 1 year	21	17	356	434	80
	Bulls over 1 year	13	18	45	70	79
	Steers over 1 year	0	0	250	0	0
Repro. Per.	Percent Pregnant <sup>2</sup>	97	98	80	68	84
	Calf survival percent <sup>3</sup>	100	97	96	95	95
Wean. Per.	Adj. ADG <sup>4</sup>	1.97	1.94	1.61	1.56	1.60
	Av. type sc. <sup>5</sup>	11.1	11.0	10.5	10.4	11.1
Postweaning Performance	No. of bulls			0	-	78
	No. of heifers			323	-	85
	No. of steers	0	0	0	-	15
Slaughtered	No. of bulls	0	0	0	-	0
	No. of heifers	0	0	0	-	0
	No. of steers	0	0	0	-	0
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system: indicate if different.

a. New projects, groups combined. b. Cattle owned by cooperator.



## Production, Inventory, and Performance Data, S-10 Herds

State Florida

Location	Gainesville	Gainesville	Gainesville	Gainesville		
Breed of sire	A,H	A,H	A,B	H,SG		
Breed of dam	Grades	Crossbred	Crossbred	Crossbred		
Line or group <sup>1</sup>	Straight- breds	AH Crisscross	AB Crisscross	HSG Crisscross		
Percent used in project	50	50	50	50		
Inventory as of July 1	Cows 2 years and over	54	53	55	54	
	Yearling heifers	17	16	13	14	
	Bulls and steers under 1 year	22	21	22	21	
	Heifers under 1 year	20	21	22	21	
	Bulls over 1 year	4	2	2	2	
	Steers over 1 year	0	0	0	0	
Repro. perf.	Percent pregnant <sup>2</sup>	86	92	96	92	
	Calf survival percent <sup>3</sup>	98	98	97	96	
Wean. perf.	Adj. ADG <sup>4</sup>	2.01	2.04	1.99	2.13	
	Av. type sc. <sup>5</sup>	11.9	11.8	10.7	11.1	
Postweaning Performance	No. of bulls	0	0	0	0	
	No. of heifers	17	16	13	14	
	No. of steers	17	18	20	20	
Slaughtered	No. of bulls	0	0	0	0	
	No. of heifers	0	0	0	0	
	No. of steers	17	18	20	20	
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatments, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustment:

5 - Suggest S-10 scoring system: indicate if different.

BROOKSVILLE BEEF CATTLE RESEARCH STATION  
Brooksville, Florida

I. PROJECT: Work Unit No. 03-30-001-10-03 (Revised)  
State Project 629

II. OBJECTIVES:

To improve the reproductive efficiency and meat producing qualities of different strains of cattle under Florida conditions, to test various breeding systems with these cattle, and to determine if combining ability can be increased with cross-progeny testing.

III. LEADERS:

Dr. Marvin Koger, Florida Experiment Station, Gainesville, Florida  
W. C. Burns, in Charge, Brooksville Beef Cattle Research Station  
Brooksville, Florida.

Cooperators:

Dr. A. C. Warnick, Florida Experiment Station, Gainesville, Florida  
Dr. A. Z. Palmer, Florida Experiment Station, Gainesville, Florida  
Dr. J. R. Crockett, Florida Experiment Station, Gainesville, Florida  
Dr. H. . Chapman, Range Cattle Experiment Station, Ona, Florida and  
State Experiment Stations cooperating in S-10.

IV. ACCOMPLISHMENTS:

1. The injection of 6,000,000 units of Vitamin A twice yearly to mature cows did not show any beneficial results.
2. Injectable Vitamin A had no beneficial results on the performance of calves.
3. The Line 6 Hereford cattle had the highest conception rate with 84%: followed by the F<sub>1</sub> Brahman x Angus crossbreds with 81%: Angus, 76% Santa Gertrudis, 75%: Line 5 Hereford, 70%: Line 4 Herefords, 64%: and Brahman lowest with 40%. One Angus, Brahman and Line 4 Hereford bull was partially sterile which accounts for the lower conception rates in the Angus, F<sub>1</sub> Brahman x Angus, Brahman x Angus, Brahman and Line 4 Hereford groups.
4. The 3/4 Angus 1/4 Brahman calves weaned the heaviest calf with 500 lbs., followed by the Santa Gertrudis with 470 lbs., Brahman, 435 lbs., Angus, 427 lbs., Line 6 Herefords, 424 lbs., Line 4 Herefords, 409 lbs., and Line 5 Herefords with 388 lbs.
5. In the "Combining Ability" study, no definite sire crossbreed interaction has developed.



## V. Future Plans:

1. Publish the Vitamin A work.
2. Discontinue the "Combining Ability" study and either revise or write a new project.

## VI. Publications:

1. Supplementing Beef Cows on Summer Pasture.

## VII. Publications Planned:

1. The Effect of Injectable Vitamin A on the Performance of Beef Cattle.

I. Work Unit No. 03-30-013-10-03  
-27-04  
State Project 1186

Title:

A Study of Response to Selection and Genetic-Environmental Interaction in Genetically Similar Groups of Hereford Cattle at two locations (Miles City, Montana and Brooksville, Florida).

II. Objectives:

- (1) To determine whether originally genetically similar groups of cattle bred and selected for several generations according to the same criteria in the two markedly different environmental conditions of Miles City, Montana and Brooksville, Florida become genetically different or remain similar.
- (2) To estimate the importance of genetic-environmental interaction within a British breed of beef cattle.
- (3) To determine the importance of adaptation to a specific location if maximum productivity is to be attained.

III. Leaders:

Project committee composed of the following persons: Representatives of the Florida and Montana Agricultural Experiment Stations as designated by the respective directors: Superintendents of the Miles City and Brooksville stations, plus not more than one additional person from each station: the W-1 and S-10 Regional Coordinators: and the Chief of the Beef Cattle Research Branch, U. S. Department of Agriculture (Chairman).

IV. Accomplishments:

- (a) The fifth calf crop has been weaned.
- (b) Performance of cattle was as follows:

<u>Line*</u>	<u>No.</u>	<u>Age at wean.</u>	<u>Sl. Grade</u>	<u>Feeder Grade</u>	<u>Weaning Weight</u>	<u>Adj. daily Gain</u>	<u>Weaning percent</u>
4	53	228	9.4	11.2	409	1.62	72
5	13	220	9.5	10.9	388	1.60	68
6	30	221	10.4	11.2	424	1.72	77

\* Line 4 = Select Miles City  
Line 5 = Control Miles City  
Line 6 = Brooksville line

I. State Project 1245

Title:

Three Months Versus Twelve Months Breeding Season for Beef Cattle.

II. Objectives:

To compare the reproductive and weaning performance of Brahman and Santa Gertrudis cows bred during three-month and continuous 12 month breeding seasons.

III. Leaders:

A. C. Warnick, Florida Experiment Station, Gainesville, Florida,  
M. Koger, Florida Experiment Station, Gainesville, Florida,  
W. C. Burns, U. S. Department of Agriculture, Brooksville, Florida.

Cooperators:

S-10 Coordinator, U. S. Department of Agriculture

IV. Accomplishments:

Season	2-year old		3-year old		4-year and older		Total		
	No.	No. Preg.	No.	No. Preg.	No.	No. Preg.	No.	No.	Preg. %
<u>SANTA GERTRUDIS:</u>									
90 days	10	9	3	0	19	14	31	23	74.2
Year-round	10	9	2	0	13	11	25	20	80.0
<u>BRAHMAN</u>									
90 days	2	0	5	1	16	3	23	4	18.2
year-round	1	1	6	2	18	12	25	15	60.0

V. Future Plans:

Continue on the same order for another two years.

VI. Publications:

None

VII. Publications Planned:

None



## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

Fla., Br.5

State Florida

Location	Brooksville	Brooksville	Brooksville	Brooksville	Brooksville
Breed of sire	Angus	Angus	Brahman	Hereford	Hereford
Breed of dam	Angus	Br-Angus	Brahman	Hereford	Hereford
Line or Group <sup>1</sup>	Purebred	Crosses	Purebred	Line 4	Line 5
Percent used in project	100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over	109	68	52	87
	Yearling heifers	37	-	12	26
	Bulls and steers under 1 year	43	32	11	22
	Heifers under 1 year	29	36	11	28
	Bulls over 1 year	47	-	15	33
Repro. Perf.	Steers over 1 year	-	-	-	-
	Percent pregnant <sup>2</sup>	76	81	40	64
	Call survival percent <sup>3</sup>	85	88	64	72
Wean. perf.	Adj. ADG. <sup>4</sup>	1.62	1.93	1.79	1.62
	Av. type sc. <sup>5</sup>	11.70	12.50	11.30	11.20
Postweaning Performance	No. of bulls	39	-	13	27
	No. of heifers	37	-	12	26
	No. of steers	-	-	-	-
Slaughtered	No. of bulls	-	-	-	15(a)
	No. of heifers	-	35	-	15(a)
	No. of steers	-	41	-	15(a)
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system: indicate if different.

S-10-1 (a) Purchased animals

6-67

Location		Brooksville	Brooksville			
Breed of sire		Hereford	S. Gert.			
Breed of dam		Hereford	S. Gert.			
Line or Group <sup>1</sup>		Line 6	Purebred			
Percent used in project		100	100			
Inventory as of July 1, 1967	Cows 2 years and over	51	61			
	Yearling heifers	18	21			
	Bulls and steers under 1 year	18	19			
	Heifers under 1 year	16	20			
	Bulls over 1 year	14	14			
	Steers over 1 year	-	-			
Repro. Perf.	Percent Pregnant <sup>2</sup>	84	75			
	Calf survival percent <sup>3</sup>	77	73			
Wean. Perf.	Adj. ADG <sup>4</sup>	1.72	2.11			
	Av. type sc. <sup>5</sup>	11.20	11.10			
Postweaning Performance	No. of bulls	12	12			
	No. of heifers	18	21			
	No. of steers	-	-			
Slaughtered	No. of bulls	-	15(a)			
	No. of heifers	-	15(a)			
	No. of steers	-	15(a)			
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system: indicate if different.

(a) Purchased animals



GEORGIA COASTAL PLAIN EXPERIMENT STATION  
Tifton, Georgia

## I. PROJECT: Animal Husbandry 209, AHRD dl-3 (S-10)

A Study of Grading, Crisscrossing and Rotational Crossing as Breeding Systems for Commercial Beef Production.

## II. OBJECTIVES:

To study the relative value of grading, crisscrossing and rotational crossing as breeding systems for commercial beef production.

To study heterotic effects in crosses between Angus and Polled Hereford breeds, as compared to heterosis in crosses between these breeds and Santa Gertrudis - a breed based partially on a Brahman foundation.

To study the comparative value of the Santa Gertrudis breed with the Angus and Polled Hereford breeds.

## III. PERSONNEL:

W. C. McCormick, T. M. Clyburn and B. L. Southwell

## IV. ACCOMPLISHMENTS DURING THE YEAR:

Weaning data for the 1966 calf crop raised by generation 1 cows are as shown in table 1.

TABLE 1. Weaning Data, 1966 Calves, Generation 1 Cows

Herd	Breeding system	No. calves	Average birth wt.	A.D.G. birth to weaning	Average type score	Average condition score
Gr. A	Grading-up	24	57	1.39	11.0	8.0
Gr. PH	Grading-up	27	60	1.38	10.4	7.8
Gr. SG	Grading-up	19	66	1.81	9.3	8.4
AxPH	Crisscrossing	31	59	1.44	10.3	7.9
AxSG	Crisscrossing	25	60	1.60	9.6	8.0
PHxSG	Crisscrossing	24	69	1.79	10.1	8.4
AxPHxSG	Rotational crossing	35	66	1.74	10.5	8.7



Weaning data for the 1966 calf crop raised by generation 2 animals are as shown in table 2.

TABLE 2 Weaning Data, 1966 Calves, Generation 2 Cows

Herd	Breeding system	No. calves	Avg. birth weight	A.D.G. birth to weaning	Avg. type score	Avg. condition score
Gr. A	Grading-up	7	55	1.41	10.7	8.0
Gr. PH	Grading-up	9	63	1.38	10.2	7.6
Gr. SG	Grading-up	6	53	1.69	9.5	8.1
AxPH	Crisscrossing	8	56	1.40	10.4	7.8
AxSG	Crisscrossing	5	57	1.54	9.2	7.9
PHxSG	Crisscrossing	8	68	1.73	10.1	8.6
AxPHxSG	Rotational crossing	8	66	1.70	10.9	8.5

Sixty generation 2 steer calves selected from the 1965 calf crop were grazed and managed as a group until slaughtered in August and September, 1966. The data for these herds are shown in table 3.

TABLE 3. Growth and Carcass Data - Generation 2 Steers

Live Animal Evaluation						
Herd	No. steers	Initial wt.	Final wt.	Daily gain	Wt./day of age	Slaughter grade
A	8	376	801	1.40	1.36	7.9
H	8	363	851	1.61	1.43	8.1
SG	8	411	903	1.60	1.56	7.4
AxH	8	344	836	1.48	1.42	8.3
AxSG	8	404	891	1.57	1.53	8.4
HxSG	8	397	928	1.73	1.58	8.6
AxHxSG	12	444	925	1.59	1.57	8.5

Carcass Evaluation							
Herd	Hot wt.	Dressing percent	Length	Grade	Rib eye/cwt.	Rib eye fat, in.	Wt. /day of age
A	458	57.2	44.81	9.8	1.95	.52	.77
H	491	57.6	45.53	9.0	1.95	.49	.82
SG	515	57.0	46.72	8.6	1.81	.34	.89
AxH	481	57.5	45.72	9.8	1.99	.60	.82
AxSG	502	56.3	46.03	9.1	1.77	.45	.86
HxSG	530	57.0	46.56	9.3	1.81	.41	.90
AxHxSG	531	57.2	47.04	9.7	1.84	.51	.90

V. FUTURE PLANS:

The studies will be continued as planned.

VI. PUBLICATIONS DURING THE YEAR:

Routine annual reports.

VII. PUBLICATIONS PLANNED:

Data for generation 1 animals completely analyzed and prepared for publication. Several reviewers suggested that data for generation 1 and generation 2 be combined in the same publication. Generation 2 data will be analyzed in the near future and results for both generations combined.

Submitted by : W. C. McCormick

I. PROJECT: State 2-99 (S-10)

Selection of Beef Cattle for Single Items of Importance in Profitable Beef Production

II. OBJECTIVES:

To obtain preliminary information on the relative effectiveness of selecting for a single character.

To observe trends in characters for which no selection is made when selection is for a single character.

III. PERSONNEL:

W. C. McCormick, T. M. Clyburn and B. L. Southwell

IV. ACCOMPLISHMENTS DURING THE YEAR:

Four herds of grade Polled Hereford females, owned and maintained by the Georgia State Prison Farm, Reidsville, are used to study selecting for (1) weaning weight, (2) rate of postweaning gain, (3) weaning score and (4) average performance. For the latter group, replacements with records nearest average for each trait are selected. Bulls used in all four groups are selected from the Polled Hereford herd at Tifton. Weaning data for the 1966 calf crop are shown in tables 1 and 2.

TABLE 1. Weaning Data, Generation 1 Cows, 1966 Calf Crop

Herd	No. calves weaned	Avg. birth weight	ADG-birth to weaning	Weaning scores	
				Type	Condition
"Average"	38	64	1.45	10.9	8.7
"Rate of gain"	32	66	1.26	9.6	7.5
"Score"	35	59	1.35	10.4	8.0
"Wean weight"	37	64	1.43	10.0	8.2



TABLE 2. Weaning Data, Generation 2 Cows, 1966 Calf Crop

Herd	No. calves weaned	Avg. birth weight	ADG-birth to weaning	Weaning scores	
				Type	Condition
"Average"	2	53	1.29	9.2	7.5
"Rate of gain"	2	51	1.13	9.0	7.3
"Score"	4	57	1.35	11.4	9.5
"Wean weight"	4	52	1.26	9.6	7.6

## V. FUTURE PLANS:

The project will be continued as outlined. Selection of generation 3 females will be completed from the 1967 calf crop.

## VI. PUBLICATIONS DURING THE YEAR:

Routine annual reports.

## VII. PUBLICATIONS PLANNED:

Production data for foundation cows and growth and carcass data for generation 1 steers have been analyzed. These data will be presented for publication as quickly as possible.

Submitted by: W. C. McCormick

I. PROJECT: Animal Husbandry 224, AHRD d1-3 (S-10)

Improvement of Performance and Carcass Quality in Beef Cattle Through Selection

II. OBJECTIVES:

To develop herds of Polled Hereford and Angus cattle with superior performance.

To progeny test Polled Hereford and Angus sires with selection criteria based primarily on pre- and postweaning growth rate, and carcass meatiness and tenderness.

III. PERSONNEL:

W. C. McCormick and B. L. Southwell

IV. ACCOMPLISHMENTS DURING THE YEAR:

The Polled Hereford herd of around 105 females was mated to five sires. Progeny tested sires 47, 853 and 1389 were bred to cows designated as superior and to tester cows. Performance tested bulls 367 and 2113 were mated to tester cows. The Angus cows were bred artificially to 934, an American Breeders Service sire and to J339, a sire owned jointly with the University of Georgia, and naturally to 498, a son of J339.

The calves were born January to March. All bull calves were creep-fed. All calves were weaned September 13, 1966. The bulls were placed on feed immediately for 168 days. Both the Angus and Polled Hereford bulls were either fed by sire groups or in lots of 10 or less. At weaning, prospective breeding heifers were separated and placed on pasture. Restricted grain feeding was practiced until small grain pasture was ready to graze. Thereafter, grain feeding was discontinued. Average performance records for all sires are shown in table 1 for bull calves only. At the end of the feeding period, calves sired by Polled Hereford sires 2113 and 367 were slaughtered to obtain carcass data as shown in table 2.

TABLE 1. Growth and Feedlot Data

<u>Breed</u>	<u>Sire</u>	<u>No. bull calves</u>	<u>Weaned weight</u>	<u>Feedlot daily gain</u>	<u>Final age</u>	<u>Wt./day of age</u>	<u>Type score</u>
PH	47	8	535	2.84	400	2.53	12.4
PH	853	7	543	2.64	402	2.46	12.6
PH	2113	5	449	2.65	393	2.28	12.4
PH	1389	12	505	2.48	398	2.32	12.2
PH	367	7	476	2.92	387	2.50	12.6
A	934	3	463	2.83	383	2.45	12.9
A	J339	5	481	2.63	379	2.43	12.8
A	498	5	459	2.20	378	2.19	12.1

TABLE 2. Carcass Data

<u>Breed</u>	<u>Sire</u>	<u>No. killed</u>	<u>Dressing percent</u>	<u>Avg. rib eye fat thickness</u>	<u>Average rib eye area/ cwt. carcass</u>	<u>Carcass wt. / day of age.</u>	<u>Carcass length</u>
PH	367	8	58.7	.49	2.29	1.24	42.9
PH	2113	9	57.1	.42	2.37	1.15	42.4

## V. FUTURE PLANS:

Continue project as outlined.

## VI. PUBLICATIONS DURING THE YEAR:

Routine annual reports.

## VII. PUBLICATIONS PLANNED:

None

Submitted by: W. C. McCormick



State Georgia

Location		Reidsville	Reidsville		Tifton	Tifton
Breed of Sire		PH, SG	A,PH,SG		PH	A
Breed of Dam		PhxSG	AxPHxSG		PH	A
Line or Group <sup>1</sup>		Criss-cross	Rotational cross		Purebred	Purebred
Percent used in project		100	100		80	80
Inventory as of July 1, 1967	Cows 2 years and over	45	62		85	42
	Yearling heifers	10	11		34	10
	Bulls and steers under 1 year	19	14		37	18
	Heifers under 1 year	15	29		44	20
	Bulls over 1 year	**	**		7	3
	Steers over 1 year	9	15		0	0
Repro. Perf.	Percent pregnant <sup>2</sup>	78	83		88	85
	Calf survival percent <sup>3</sup>	97	98		92	95
Wean. Perf.	Adj. ADG. <sup>4</sup>	1.78	1.74		1.83*	1.79*
	Av. type sc. <sup>5</sup>	10.1	10.6		12.1	12.1
Postweaning Performance	No. of bulls	0	0		39	13
	No. of heifers	0	0		39	16
	No. of steers	8	12		0	0
Slaughtered	No. of bulls	0	0		7	0
	No. of heifers	0	0		10	0
	No. of steers	8	12		0	0
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustment: \* Sex (to steer basis) and age of dam.

5 - Suggest S-10 scoring system; indicate if different.

\*\* Same bulls used in three grade groups.

## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

## State Georgia

Location		Reidsville	Reidsville	Reidsville	Reidsville	
Breed of Sire		PH	PH	PH	PH	
Breed of Dam		Gr. PH	Gr. PH	Gr. PH	Gr. PH	
Line or Group <sup>1</sup>		Wean wt.	Rate of gain	Type	Average	
Percent used in project		100	100	100	100	
Inventory as of July 1, 1967	Cows 2 years and over	65	48	62	54	
	Yearling heifers	16	10	13	18	
	Bulls and steers under 1 year	30	22	26	14	
	Heifers under 1 year	24	18	28	26	
	Bulls over 1 year	2	2	2	2	
	Steers over 1 year	0	0	0	0	
Repro. Perf.	Percent pregnant <sup>2</sup>	85	77	82	86	
	Calf survival percent <sup>3</sup>	89	94	87	93	
Wean. Perf.	Adj. ADG <sup>4</sup>	1.42	1.25	1.35	1.44	
	Av. type sc. <sup>5</sup>	10.0	9.6	10.5	10.8	
Postweaning Performance	No. of bulls	0	0	0	0	
	No. of heifers	24	15	19	25	
	No. of steers	0	0	0	0	
Slaughtered	No. of bulls	0	0	0	0	
	No. of heifers	0	0	0	0	
	No. of steers	0	0	0	0	
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: None

5 - Suggest S-10 scoring system; indicate if different.



## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Georgia

Location		Reids-ville	Reids-ville	Reids-ville	Reids-ville	Reids-ville
Breed of sire		A	PH	SG	A,PH	A,SG
Breed of Dam		Gr. A	Gr. PH	Gr. SG	AxPH	AxSG
Line or Group <sup>1</sup>		Grade	Grade	Grade	Criss-cross	Criss-cross
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over	43	42	40	45	42
	Yearling heifers	9	12	7	9	10
	Bulls and steers under 1 year	23	22	16	21	18
	Heifers under 1 year	14	17	11	28	17
	Bulls over 1 year	4	4	4	**	**
	Steers over 1 year	8	9	9	10	9
Repro. Perf.	Percent pregnant <sup>2</sup>	84	82	69	91	86
	Calf survival percent <sup>3</sup>	90	97	92	97	97
Wean. Perf.	Adj. ADG: <sup>4</sup>	1.40	1.38	1.78	1.43	1.59
	Av. type sc. <sup>5</sup>	10.9	10.3	9.3	10.3	9.5
Postweaning Performance	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	No. of steers	8	8	8	8	8
Slaughtered	No. of bulls	0	0	0	0	0
	No. of heifers	0	0	0	0	0
	No. of steers	8	8	8	8	8
Remarks						

- 1 - Purebreds, grade, line, sire number, crosses, treatment, etc.
  - 2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.
  - 3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.
  - 4 - Indicate adjustment: None
  - 5 - Suggest S-10 scoring system; indicate if different.
- \*\* Same bulls used in three grade groups.



UNIVERSITY OF KENTUCKY  
Agriculture Experiment Station  
Lexington, Kentucky

I. PROJECT: Animal Science 260 (S-10)

Measurement and Selection of Economically Important Traits in Beef Cattle

II. OBJECTIVES:

To use rate of gain, efficiency of gain, conformation and carcass characteristics in an overall selection experiment.

III. PERSONNEL:

N. W. Bradley, L. V. Cundiff, J. R. Overfield, D. G. Steele and J. D. Kemp.

IV. ACCOMPLISHMENTS DURING THE YEAR:

The herd of Hereford cattle being used by the University of Kentucky in this project includes 974 head of varying ages and sexes. Of these 518 are presently station owned and 456 are cooperator owned. During January, February and March of 1967, 239 of the cooperator-owned cows were bred to 10 two-year old bulls retained for progeny test. At the present 231 station owned cows and heifers are being mated artificially to 4 superior, progeny tested bulls. All females failing to conceive at first service are being pasture-mated to the 6 top producing herd sires now in this project.

Results of pre- and post-weaning performance of bull and heifer calves born in 1966 are summarized according to sires in Tables 1 and 2, respectively. Of the 70 bulls available, eleven were selected for progeny testing.

During the year carcass data were collected on bull calves slaughtered from the 1965-calf crop. These data are presented in Table 3 and are summarized by sire groups.

Table 1. -- Prewearing and Postweaning Performance of Bulls on Test in 1966

	Sire							
	E-2	Z-6	A41	C-30	P28	P24	HRH1	HH6
<u>Prewearing</u>								
Number	14	11	10	9	12	8	8	3
Weaning wt., lb <sup>a</sup> /	328	345	325	309	361	320	324	378
Average daily gain, lb	1.29	1.36	1.29	1.19	1.47	1.29	1.27	1.61
Adj av daily gain, lb	1.27	1.33	1.28	1.17	1.45	1.24	1.25	1.53
Type <sup>b</sup> /	10.4	10.5	11.2	10.6	10.8	10.1	9.5	11.7
Index <sub>c</sub> /	84	88	89	82	94	82	80	101
<u>Postweaning</u>								
Number	14	11	9	9	12	6	7	3
Age in days	368	372	381	390	375	375	389	390
Final wt. lb	726	803	763	768	794	791	821	866
Average daily gain, lb	2.58	2.86	2.69	2.85	2.83	2.87	2.97	2.76
Wt./day of age, lb	1.97	2.15	2.00	1.97	2.12	2.12	2.11	2.22
Type <sup>b</sup> /	10.6	10.7	11.6	11.3	11.3	11.0	10.1	10.7
Index <sub>d</sub> /	126	136	133	135	137	136	134	135
<u>a/</u> Actual weaning weights adjusted for sex of calf, age of dam and to 205-days.								
<u>b/</u> 10 = average good; 11 = high good; 12 = low choice.								
<u>c/</u> Prewearing index = (40 x Adj. ADG) - 18 + 5 (type score).								
<u>d/</u> Postweaning index = [ (20 x ADG) + 20 x (WDA) ] - 18 + 5 (type score).								

Table 2. -- Preweaning and Postweaning Performance of Heifers on Test in 1966

	E-2	Z-6	A41	C-30	PZ8	PZ4	HRH1	HH6
<u>Preweaning</u>								
Number	5	5	9	10	6	7	9	3
Weaning wt., lb <sup>a/</sup>	354	339	354	350	330	334	348	358
Average daily gain, lb	1.28	1.20	1.27	1.27	1.25	1.24	1.28	1.36
Adj av daily gain, lb	1.44	1.32	1.43	1.40	1.32	1.32	1.39	1.43
Type <sup>b/</sup>	10.0	10.8	10.9	10.7	10.8	10.6	9.9	10.7
Index <sup>c/</sup>	89	89	93	91	89	88	87	93
<u>Postweaning</u>								
Number	5	5	9	10	6	7	8	2
Age in days	372	387	389	385	393	380	390	381
Final wt., lb	532	554	566	576	586	560	597	685
Average daily gain, lb	1.41	1.40	1.39	1.53	1.62	1.52	1.53	1.72
Wt/day of age, lb	1.43	1.43	1.45	1.50	1.49	1.47	1.53	1.81
Type <sup>b/</sup>	10.6	10.8	11.4	11.4	11.0	10.9	10.9	11.0
Index <sup>d/</sup>	91	92	96	99	99	96	97	107

a/ Actual weaning weights adjusted for sex of calf, age of dam and to 205-days.

b/ 10= average good; 11=high good; 12=low choice.

c/ Preweaning index = (40 x adj. ADG) - 18 + 5 (type score).

d/ Postweaning index = [ (20 x ADG) + 20 x (WDA) - 18 + 5 (type score)



Table 3. --- Carcass Characteristics of Bulls by 7 Sires (1965 calves)

Item	Sire						
	181H	HP15	P28	A41	C-30	E-2	Z-6
Number	8	9	3	3	2	2	2
Wt at slaughter, lb	783	734	723	822	850	718	865
Cold carcass wt, lb	450	423	416	495	476	389	513
Dressing, % <sub>a</sub>	57.3	57.8	57.3	60.3	56.1	54.0	59.2
Conformation <sub>b</sub>	10.9	12.6	10.7	12.7	12.0	11.5	11.0
Marbling score <sub>c</sub>	3.3	3.7	2.7	3.7	4.0	3.0	3.5
Rib-eye-area, sq in.	10.2	10.4	10.3	11.4	10.9	10.3	11.6
Fat thickness, in.	0.4	0.4	0.3	0.4	0.4	0.3	0.2
Kidney fat, %	2.0	2.1	2.0	2.5	2.3	2.3	2.3
Cutability group <sub>d</sub>	1.9	1.7	1.6	1.8	2.0	1.8	1.6
carcass grade <sub>b</sub>	8.8	9.6	8.3	8.7	9.5	9.0	9.5
Color of fat	2.0	2.1	2.0	2.3	2.5	2.0	2.0
Color of lean	4.8	4.8	3.7	5.3	5.5	5.0	3.5
9-10-11th rib separation							
% fat	22.6	24.8	20.7	26.4	28.4	23.1	25.1
% lean	59.2	57.2	60.4	55.9	58.4	58.3	59.3
% bone	15.8	16.8	16.1	15.2	15.8	15.9	15.8
Taste panel							
Flavor	7.3	7.3	7.2	7.1	7.0	7.3	7.5
Juiciness	7.2	7.0	7.0	6.8	7.1	7.1	7.3
Tenderness	6.8	6.8	7.1	6.6	6.2	6.9	6.9
Overall satisfaction	7.1	7.1	7.2	6.8	6.6	7.1	7.2

a/ Calculated using chilled carcass weight.

b/ 8= high standard; 9 = low good; 10 = average good; 11 = high good.

c/ 3 = traces; 4 = slight; 5 = small.

d/ Cutability group --- 2.50 + (2.50 x adj. fat thickness, in.) + (0.20 x % kidney fat) + (0.0038 x hot carcass wt., lb.) - (0.32 x rib-eye-area, sq. in.).

V. FUTURE PLANS:

Future plans are to proceed according to the project outline as rapidly as time and facilities permit. The foundation herd of 230 cows will be rigidly culled in the fall of 1967, and the control herd established.

VI. PUBLICATIONS DURING THE YEAR:

Bradley, N. W., L. V. Cundiff, J. D. Kemp and T. R. Greathouse. 1966. Effect of Sex and Sire on Performance and Carcass Traits of Hereford and Hereford-Red Poll Calves. J. Animal Sci. 25:783.

Bradley, N. W., L. V. Cundiff, J. D. Kemp, J. R. Overfield and A. W. Young. 1966. Measurement and Selection of Economically Important Traits in Beef Cattle. Kentucky Animal Sciences Research Reports. University of Kentucky Agr. Exp. Sta. Prog. Report 170.

VII. PUBLICATIONS PLANNED:

Results will be published annually in the Kentucky Animal Sciences Research Reports and elsewhere as justified.

Submitted by:

N. W. Bradley



## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Kentucky

Location		Princeton	Cold-stream	Walnut Hall Stud	Mereworth Farms	
Breed of sire		Hereford	Hereford	Hereford	Hereford	
Breed of Dam		Hereford	Hereford	Hereford	Hereford	
Line or Group <sup>1</sup>		Station	Station	Coop	Coop	
Percent used in project		100	100	100	100	
Inventory as of July 1, 1967	Cows 2 years and over	191	0	0	239 <sup>a</sup>	
	Yearling heifer	40	0	0	0	
	Bulls and steers under 1 year	75	40	0	0	
	Heifers under 1 year	77	40	0	0	
	Bulls over 1 year	15	20	0	0	
	Steers over 1 year	0	0	0	0	
Repro. Perf.	Percent pregnant <sup>2</sup>	95.3	-	-	a	
	Calf survival percent <sup>3</sup>	91.6	-	-	a	
Wean. Perf.	Adj. ADG <sup>4</sup>	1.33	-	1.46 <sup>b</sup>	1.79	
	Av. type sc. <sup>5</sup>	10.5	-	11.2 <sup>b</sup>	11.5	
Postweaning Performance	No. of bulls	71	0			
	No. of heifers	52	9			
	No. of steers	0	9			
Slaughtered	No. of bulls	59	0			
	No. of heifers	0	9			
	No. of steers	0	9			
Remarks						

a Cows bred to 10 bulls --- Winter of 1967 for progeny testing

b Calves calved in 1966

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

S-10-1 4 - Indicate adjustments: Adjusted for age of dam, sex of calf and to 205-days.

6-67 5 - Suggest S-10 scoring system: indicate if different.



LOUISIANA STATE UNIVERSITY  
Agricultural Experiment Station  
Baton Rouge, Louisiana

I. PROJECT: 605 (S-10)

Comparison of Various Crossbred Cattle Under Gulf Coast Conditions with Respect to Rate of Growth on Pasture, Fattening Ability, and Meat Quality of Steers

II. OBJECTIVES:

To study types and breeds of beef cattle to determine which are best suited to Gulf Coast conditions, with respect to rate of growth, fattening ability, and meat quality.

To study various crossbreeding programs as to practicality, production, and usefulness.

To study the amount of hybrid vigor obtained through crossing beef breeds and to ascertain how much of this hybrid vigor is maintained through subsequent backcrossing, multiple-breed crossing, and rotational crossing.

To study the productive ability of dams of various breeds and breed crosses.

To estimate genetic parameters.

To study practical problems of management and marketing of crossbred cattle in the Gulf Coast area.

III: PERSONNEL:

J. W. Turner, A. M. Mullins, R. F. Boulware, Ted O. McRae, G. L. Robertson and Dorothy Wilson

IV. ACCOMPLISHMENTS DURING THE YEAR:

The 1966 calf crop was the sixth produced under the current phase III of the crossbreeding project. This phase is designed so that contemporary straightbred, singlecross, backcross and three-breed cross calves may be evaluated. In addition, a few three-breed rotational cross calves and some grade Charolais calves are now being produced. Summary statistics for preweaning, postweaning and carcass measures are presented by a breed-of-sire and mating-type classification in tables 1, 2 and 3 for the 1966 calves. No analyses were run of these data as this information will be pooled with data from past years for a future analysis where there will be sufficient subclass numbers for all classes.

One graduate student, Mr. John S. Sullivan, Jr., completed the requirements for the Ph. D. degree and it was awarded in August, 1966. The title of his dissertation was "A Comparison of Different Methods of Adjustment for the Effects of Age, Sex of Calf, and Age of Dam." Mr. Sullivan used data from 16,620 calves produced in 82 private herds enrolled on the Louisiana-On-The-Farm Production Testing Program. Results from this dissertation indicated that a multiplicative adjustment procedure was most appropriate for age and sex of calf effects, while additive adjustments were more applicable to age of dam effects. A similar analysis was applied to preweaning data collected from Project 605 and the results were nearly identical. Adjustment procedures in accord with the analysis were adopted for use.

Permanent data cards following a standard format were constructed from all data recorded from Project 605. Preweaning and postweaning cards were made for steer progeny, while only the preweaning card was used for female progeny. Permanent cow records were completed on all breeding females in the form of a herd record file sheet.

Table 1. 1966 Summary of Preweaning Performance by Breed of Sire

Breed of Sire	Number Calves	Birth Date	Birth Wt. (lb.)	Type Score <sup>a</sup>	Slaughter Score <sup>a</sup>	A.D.G. (lb.)	adj. Wng. Wt. <sup>b</sup> (lb.)
Angus	45	44.1	67.5	11.6	11.3	1.69	456.8
Brahman	28	55.7	71.7	11.4	10.8	1.80	424.5
Brangus	28	51.5	73.6	11.2	10.4	1.78	459.3
Charolais	73	61.4	79.4	11.5	10.4	1.81	475.7
Hereford	42	63.7	70.2	11.1	10.7	1.69	441.2
Total	216	56.4	73.4	11.4	10.7	1.76	456.3

<sup>a</sup> 10 represents Average Good with unit change equal to one-third of a grade.

<sup>b</sup> Adjusted to 205-day steer calf from a mature age of dam (5-11 years).



Table 2. 1966 Summary of Postweaning and Carcass Traits by Breed of Sire

Breed of Sire	Number Steers	Slgh. Wt. (lb.)	A.D.G. Gain	Carcass Grade <sup>a</sup>	Hot Dressing Percent	Shear Strength (lb.)	Ribeye Area (in.)	Yield Grade	Fat Thick. (in.) <sup>b</sup>
Angus	13	731.8	1.71	11.5	61.2	22.79	9.65	2.6	0.54
Brahman	13	705.1	1.54	9.8	63.1	34.47	9.14	2.7	0.66
Brangus	17	764.9	1.85	10.4	60.2	23.76	9.19	2.8	0.66
Charolais	30	790.6	2.09	10.2	62.3	25.36	11.24	1.8	0.39
Hereford	22	754.9	1.79	10.9	60.9	29.25	9.39	2.8	0.56
Total	95	757.9	1.85	10.5	61.6	26.87	9.94	2.4	0.54

<sup>a</sup> 10 represents Average Good with unit change equal to one-third grade.<sup>b</sup> Represents an average of three measurements.

Table 3. 1966 Summary of Postweaning and Carcass Traits by Mating-Type Classification

Mating Type	Number Steers	Slgh. Wt. (lb.)	A.D.G. Gain	Carcass Grade <sup>a</sup>	Hot Dressing Percent	Shear Strength (lb.)	Ribeye Area (in.)	Yield Grade	Fat Thickness (in.) <sup>b</sup>
Straight-bred	10	724.7	1.77	10.4	61.1	30.22	9.11	2.8	0.59
Single-cross	17	783.8	1.91	10.7	61.4	24.78	9.86	2.7	0.72
Backcross	18	717.2	1.62	10.3	61.7	28.62	9.28	2.6	0.58
3-Breed Cross	23	782.8	1.80	10.9	62.1	26.93	9.76	2.7	0.58
Rotational Cross	7	745.6	1.77	11.0	60.6	28.93	9.57	2.6	0.54
Grade Charolais	20	762.8	2.14	10.0	61.8	24.80	11.37	1.5	0.34

<sup>a</sup> 10 represents Average Good with unit change equal to one-third grade.<sup>b</sup> Represents an average of three measurements.



V. FUTURE PLANS:

Revision plans have been prepared and it is anticipated that the project will change design and format within the next year. Approval of the revision plans is expected so that the revised project will be under way by the 1968 breeding season. The revision plans call for study directed toward evaluating systematic crossbreeding systems.

Several analyses and terminal publications are planned to complete the objectives of the current outline.

VI. PUBLICATIONS DURING THE YEAR:

Turner, J. W. and B. R. Farthing. 1967. Heterosis in reproductive performance of beef cows. J. Animal Sci. 26:207. (Abstr.)

Turner, J. W., Stewart H. Fowler, George L. Robertson and Dorothy C. Wilson. 1967. Reproductive performance of straightbred and crossbred beef cows in Louisiana. Louisiana Agriculture 10:2:10.

VII. PUBLICATIONS PLANNED:

- a) Heterosis in postweaning and carcass traits of beef steers.
- b) Comparisons between straightbred, singlecross, backcross and three-breed cross calves for beef producing abilities.
- c) Estimation of general and specific combining abilities for the Angus, Brahman, Brangus and Hereford breeds.
- d) Observations on the grading-up of a grade Charolais herd from various base breeds.

## Production, Inventory, and Performance Data, S-10 Herds - 1966 - 1967

State Louisiana

Location		Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	
Breed of sire		Angus	Angus	Brahman	Brahman	Brangus	
Breed of Dam		Angus	(a)	Brahman	(a)	Brangus	
Line or Group <sup>1</sup>		Straight-bred	(b)	Straight-bred	(b)	Straight-bred	
Percent used in project		100	100	100	100	100	
Inventory as of July 1, 1967	Cows 2 years and over	10	55	12	55	12	
	Yearling heifers	4	12	1	8	0	
	Bulls and steers under 1 year	2	28	5	20	4	
	Heifers under 1 year	4	28	3	22	4	
	Bulls over 1 year	5	0	5	0	4	
	Steers over 1 year	0	0	0	0	0	
Repro. Perf.	Percent pregnant <sup>2</sup>	50.0	71.1	72.7	59.1	58.3	
	Calf survival percent <sup>3</sup>	100.0	87.5	50.0	88.5	85.7	
Wean. Perf.	Adj. ADG <sup>4</sup>	1.30	1.72	1.76	1.81	1.87	
	Av. type sc. <sup>5</sup>	10.9	11.6	11.6	11.4	11.3	
Postweaning Performance	No. of bulls						
	No. of heifers						
	No. of steers	1	13	3	10	4	
Slaughtered	No. of bulls						
	No. of heifers						
	No. of steers	1	13	3	10	4	
Remarks							

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system: indicate if different.



## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Louisiana

Location	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	Baton Rouge	
Breed of sire	Brangus	Charolais	Charolais	Charolais	Hereford	
Breed of dam	(a)	Charolais crosses	Charolais	Charolais crosses	Hereford	
Line or Group <sup>1</sup>	(b)	Single crosses	Straight-bred	Back crosses	Straight-bred	
Percent used in project	100	100	100	100	100	
Inventory as of July 1, 1967	Cows 2 years and over	75	41	3	71	12
	Yearling heifers	0	6	1	27	3
	Bulls and steers under 1 year	19	26	2	22	3
	Heifers under 1 year	12	10	0	25	7
	Bulls over 1 year	0	0	4	0	3
	Steers over 1 year	0	0	0	0	0
Repro. Perf.	Percent pregnant <sup>2</sup>	61.9	42.1	100.0	66.2	41.7
	Calf survival percent <sup>3</sup>	84.6	93.8	100.0	98.1	100.0
Wean. Perf.	Adj. ADG <sup>4</sup>	1.76	1.96	1.78	1.76	1.21
	Av. type sc. <sup>5</sup>	11.2	12.5	10.5	11.2	9.3
Postweaning Performance	No. of bulls					
	No. of heifers					
	No. of steers	13	8	1	24	3
Slaughtered	No. of steers	13	7	1	23	3
	No. of heifers					
	No. of bulls					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustment:

5 - Suggest S-10 scoring system: indicate if different.



## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Louisiana

Location	Baton Rouge	Baton Rouge	Baton Rouge		
Breed of sire	Hereford	(c)			
Breed of dam	(a)	(a)			
Line or Group <sup>1</sup>	(b)	(d)			
Percent used in project	100	100	Total No. Animals		
Inventory as of July 1, 1967	Cows 2 years and over	77	0	423	
	Yearling heifers	11	0	73	
	Bulls and steers under 1 year	20	0	151	
	Heifers under 1 year	20	0	135	
	Bulls over 1 year	0	0	21	
	Steers over 1 year	0	0	0	
Repro. Perf.	Percent pregnant <sup>2</sup>	78.3	34.4		
	Calf survival percent <sup>3</sup>	100.0	72.4		
Wean. Perf.	Adj. ADG <sup>4</sup>	1.77	1.94		
	Av. type Sc. <sup>5</sup>	11.4	12.4		
Postweaning Performance	No. of bulls				
	No. of heifers				
	No. of steers	19	0		
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers	19	0		
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5-10-1 5 - Suggest S-10 scoring system: indicate if different.

EXPLANATORY NOTES

for

PRODUCTION, INVENTORY, AND PERFORMANCE DATA SHEETS

Louisiana Project 605 (S-10)

- (a) Dams: Straightbreds - Angus, Brahman, Brangus, and Hereford  
Single crosses - A-B, A-BA, A-H: B-A, B-BA, B-H: BA-A,  
BA-B, BA-H:C-A, C-B, C-BA, C-H: and  
H-A, H-B, H-BA  
Three-breed crosses - Angus, Brahman, Brangus, Charolais  
and Hereford: i.e., A-B-BA, B-BA-H:  
B-C-H, etc.
  - (b) Straightbreds, single crosses and three-breed crosses
  - (c) Angus and Charolais sires (artificial breeding)
  - (d) Heifers bred to calve at 2 years of age.
- 4 No adjustment on ADG
- 5 10 represents Average Good with unit change equal to one-third grade



IBERIA LIVESTOCK EXPERIMENT STATION  
Jeanerette, Louisiana

I. PROJECT:

Selection for changes in leanness in beef cattle and a study of the response to selection for adaptability in the Gulf Coast area. AHd1-6, revised 1964.

II. OBJECTIVES:

1. To determine whether changes in leanness of Angus and Brangus cattle can be made by selection in opposite directions for fatness.
2. To estimate genetic and environmental relationships of fatness and leanness with other carcass and production traits.
3. To evaluate if more rapid adaptation and performance of Angus cattle to the Gulf Coast area can be made by selection of the best available replacements from within the area or by selection of the best available replacement (sires) from outside the area.

III. PERSONNEL:

T. M. DeRouen, D. C. Meyerhoeffler, W. L. Reynolds, A. M. Mullins, R. F. Boulware, J. W. Turner, and E. J. Warwick.

IV. ACCOMPLISHMENTS:

1. Scope of Work:

Data have been collected on the various aspects of the fat study and the adaptability project. Numbers are small, the project is in its initial stages, consequently, it is not possible to note differences of any magnitude.

2. Research Results:

a. Breeding Season and Conception:

A total of 224 cows were sorted into 18 single sire herds. Two of these herds were bred artificially. The breeding season began on May 1, and lasted for 75 days. The breeding season was moved from April 15 to May 1, with year 1966.

All cows exposed to bulls during the breeding season were palpated for pregnancy during the late September and early October. Conception rates are shown in the schedule for Production, Inventory and Performance Data. The overall conception rate was 69%. The Brangus and the Angus in the fat study were similar with 74% pregnant for each breed. The Angus females in the adaptability study had a conception rate of 58%. Part of this is due to the low conception of the two year old heifers which had nursed calves during the breeding time. Conception rate for the Angus cows in the adaptability study was identical for those mated naturally and for those bred artificially. The Brangus high fat cows had a much higher conception than the low fat cows in 1966. However, the low fat Angus cows had a higher conception rate than the high fat Angus females.

b. Calving and Weaning Performance:

Calf survival is calculated on the mortality of calves during the first 72 hours post-partum. The mortality rate of Brangus calves was 13%. The Brangus calves from the low fat group had the higher mortality. The death loss of Angus calves in the fat study was 12%. Angus calves in the high fat line had the greater mortality. Angus calves from the adaptability project had the lowest death rate of all the groups - 8%. Numbers are small for the adaptability Angus calves.

Adverse weather conditions contributed to the high death losses of calves during the first three days post-partum. The summary of calf survival is shown in the schedule of Production, Inventory and Performance Data.

All calves were weaned when each one reached  $180 \pm 7$  days of age. The growth rate of the calves from birth to weaning indicates, for this year, that the calves in the low fat lines (Brangus and Angus) grew 0.25 of a pound per day faster than those in the high fat line. The average daily gain of the calves in the adaptability study were similar for the local sired calves and the calves sired by outside bulls. Numbers are small. None of the calves were creep fed.

The summary of the weaning performance is shown in the scheduling of Production, Inventory and Performance Data.

c. Post-weaning Performance:

Bull calves in the fat and adaptability studies were weaned when each one reached  $180 \pm 7$  days of age. The fat study calves were immediately put on feed test in dry lot in groups until each bull reached a weight of  $800 \pm 10$  pounds. At this weight each calf was evaluated for conformation, slaughter score and measured for fat thickness over the thirteenth rib. Fat measurements were obtained with an ultrasonic instrument. The bull calves in the adaptability study were individually fed until they were 365 days old. They were then evaluated for growth and conformation. An index was calculated for each bull giving equal emphasis to type and growth rate.



Post-weaning Performance of Bulls fed in 1965-66

Breed	Brangus	Brangus	Brangus	Angus	Angus	Angus	Angus
Breed of sire	Brangus	Brangus	Brangus	Angus	Angus	Angus	Angus
Breed of Dam	Brangus	Brangus	Brangus	Angus/a	Angus/a	Angus	Angus
Study	Hi. Fat	Low Fat	Low Fat	Hi. Fat	Low Fat	Adapt(Local)	Adapt. (Outside)
No. in group (b)	10	16	4	5	6	13	
Av. initial wt.	345	315	290	321	307	308	
No. days feed	196	198	218	221	185	186	
Av. Final wt.	804	803	796	808	733	745	
Adg. on test	2.30	2.45	2.33	2.25	2.38	2.34	
Av. age end test (days)	377	377	396	401	365	366	
Av. type score	9.6	9.2	12.4	9.8	12.7	11.9	
Av. cond. score	9.8	9.4	11.8	9.8	11.9	11.4	
Fat thickness (mm)	9.8	9.3	11.0	7.9			
Feed/lb. gain					7.09	7.06	

(a) Two bulls omitted for not weighing 800 lbs in 450 days

(b) Approximately 25 % of bulls slaughtered.

# Slaughter Data of Bulls - 1966

Breed	Brangus	Brangus	Angus	Angus	Angus	Angus	Angus
Breed of Sire	Brangus	Brangus	Angus	Angus	Angus	Angus	Angus
Breed of Dam	Brangus	Brangus	Angus	Angus	Angus	Angus	Angus
Study	Hi. Fat	Low Fat	Hi. Fat	Low Fat	Adapt.(local)	Adapt.(outside)	
No. slaughtered (e)	6	6	3	1	1	4	
Slaughter age - days	440	439	477	466	441	412	
Days fed	258	261	299	292	264	230	
Final wt.(feed lot)	851	871	846	820	756	798	
Slaughter wt. (a)	831	848	832	810	755	794	
Carcass wt. (cold)	493	492	478	474	442	475	
Dressing percent (cold)	59.18	58.05	57.47	58.52	58.54	59.60	
Carcass grade-quality	10.2	8.8	8.0	8.0	9.0	9.2	
Carcass grade-yield (b)	1.8	1.5	1.6	1.1	1.9	1.8	
Kidney fat % (b)	2.2	1.4	1.2	1.0	2.0	1.75	
Rib eye area (actual)							
(sq. ins.)	10.89	10.33	9.93	11.22	10.83	10.96	
Rib eye /100 lb. carcass							
(sq. ins.)	2.22	2.11	2.10	2.37	2.45	2.32	
Marbling							
Fat thickness over	9.0	5.8	6.0	3.0	8.0	8.5	
ribeye (mm) (c)	7.1	5.8	6.1	4.3	10.9	8.6	
Shear (d)	36.12	33.19	28.78	26.00	29.08	15.97	

- (a) Weighed at plant just before slaughter.
- (b) Estimated by federal grader.
- (c) Measured at three places and averaged.
- (d) One inch core. Deep fat method of cooking.
- (e) Approximately 25% of bulls slaughtered for carcass evaluation.



Data obtained in the 1966 feed lot performance test indicated small differences between the Brangus fat bulls, between the Angus fat bulls and between the Angus adaptability bulls. Angus bulls in the fat project showed a 3.1 mm. difference between the high and low fat lines based on live animal measurements.

This information is summarized in the schedule of Post-weaning Performance of Bulls.

#### d. Slaughter Data

Slaughter data were obtained on a small number of bulls in each of the studies. It is very difficult at this time to make definite statements. However, it is noted that even at this early stage the cattle in the fat study are showing trends of separating into their respective high fat and low fat lines.

The Angus cattle in the adaptability experiment show very little difference in carcass evaluation. The principal difference at this time is in tenderness.

Slaughter information is summarized in the schedule on Slaughter Data of Bulls.

### 3. Purchase of Cattle:

In order to get the project up to numbers, sixty-three (63) yearling Angus heifers were purchased and twelve (12) Angus heifers were transferred from another project at the station. Fifty (50) of the above females were pure-bred heifers assigned to the adaptability study. Thirteen (13) grade Angus heifers and the twelve (12) transferred females were consigned to the fat study.

### 4. Improvement of Facilities:

- a. New dial type scale installed for weighing cattle.
- b. Additional cross fences constructed in marsh adding three more pastures.
- c. New bridge constructed across public drainage canal in marsh. Bridge was built at expense of parish (county) government since it was damaged when they dredged the canal a few years ago.
- d. New Squeeze chute was purchased.

### FUTURE PLANS:

1. To follow plans of project.

2. Improvements:

- a. Construct additional pens at annex to facilitate sorting and handling of cattle.
- b. Build roof over working chute at annex to permit its use during rain and inclement weather.

- c. Construct fenced lanes from pastures at annex to working pens permitting economical, practical and easier way of moving and driving cattle.
- d. Build two small holding pens at strategic locations at annex to prevent having to drive cattle across busy highway and two railroads and also keep from having to drive sick or injured cattle long distance (1 1/4 miles).
- e. Repair culvert bridges at annex.
- f. Continue to drain, crown and seed marsh to suitable forages.
- g. Improve drainage.

#### VI. PUBLICATIONS:

- T. M. DeRouen, W. L. Reynolds and D. C. Meyerhoeffler. 1967. Mortality of Beef Calves in the Gulf Coast Area. J. Animal Sci. 26:202. (abst)
- W. L. Reynolds, T. M. DeRouen and D. C. Meyerhoeffler. 1967. Milk Production of Angus, Brahman and Zebu-Cross Cows. J. Animal Sci. 26:206. (abst)
- W. L. Reynolds, T. M. DeRouen and D. C. Meyerhoeffler. 1967. Feed Value of Various Roughages for Finishing Steers. J. Animal Sci. 26:227. (abst)
- T. M. DeRouen, W. L. Reynolds, D. C. Meyerhoeffler, H. C. Gonsoulin and N. T. Poche. 1966. Beef Cattle Research at the Iberia Livestock Experiment Station. Sixth Livestock Producers' Day Report. Dept. of Animal Science. Louisiana State University and Agricultural Experiment Station, Baton Rouge.
- Station Annual Report.

#### VII. PUBLICATIONS PLANNED:

- 1. Review of the old project.
- 2. Study of Shrink in cattle.



## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Louisiana

Location		Jeanerette	-----	-----	-----	-----
Breed of sire		Brangus	Brangus	Angus	Angus	
Breed of Dam		Brangus	Brangus	Angus	Angus	
Line or Group <sup>1</sup>		High Fat	Low Fat	High Fat	Low Fat	
Percent used in project		100%	100%	100%	100%	
Inventory as of July 1, 1967	Cows 2 years and over	39	50	36	33	
	Yearling heifers	38	33	29	22	
	Bulls under 1 year	22	25	18	14	
	Heifers under 1 year	16	26	18	17	
	Bulls over 1 year	9	9	10	9	
	Steers over 1 year	0	0	0	0	
Repro. Perf.	Percent pregnant <sup>2</sup>	81	67	65	84	
	Calf survival percent <sup>3</sup>	94	80	83	92	
Mean. Perf.	Adj. ADG: <sup>4</sup>	1.67	1.91	1.34	1.60	
	Av. type sc. <sup>5</sup>	10.4	10.3	10.1	10.7	
Postweaning Performance	No. of bulls	10	16	4	7	
	No. of heifers	0	0	0	0	
	No. of steers	0	0	0	0	
Slaughtered	No. of bulls	6	6	3	1	
	No. of heifers	0	0	0	0	
	No. of steers	0	0	0	0	
Remarks						

- 1 - Purebreds, grade, line, sire number, crosses, treatment, etc.  
 2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.  
 3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.  
 4 - Indicate adjustments: sex of calf and age of dam.  
 5 - Suggest S-10 scoring system: indicate if different.



State Louisiana

Location		Jeanerette			
Breed of sire		Angus	Angus		
Breed of dam		Angus	Angus		
Line or Group <sup>1</sup>		Adapt. Local	Adapt Outside		
Percent used in project		100%	100%		
Inventory as of July 1, 1967	Cows 2 years and over	54	28		
	Yearling heifers	26	11		
	Bulls under 1 year	14	3		
	Heifers under 1 year	11	6		
	Bulls over 1 year	7	0		
	Steers over 1 year	0	0		
Repro. Perf.	Percent pregnant <sup>2</sup>	58	58		
	Calf survival percent <sup>3</sup>	83	100		
Mean. Perf.	Adj. ADG. <sup>4</sup>	1.47	1.39		
	Av. type sc. <sup>5</sup>	11.2	12.0		
Postweaning Performance	No. of bulls	6	13		
	No. of heifers	0	0		
	No. of steers	0	0		
Slaughtered	No. of bulls	1	4		
	No. of heifers	0	0		
	No. of steers	0	0		
Remarks					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: sex of calf, age of dam.

5 - Suggest S-10 scoring system; indicate if different.

MISSISSIPPI STATE UNIVERSITY  
Agricultural Experiment Station

## I. PROJECT: Hatch 666 (S-10)

A Study to Determine the Breeding Worth of Inbred and Outbred Bulls from Various Sources.

## II. OBJECTIVES:

To compare pre- and postweaning growth rates, market grades, carcass qualities, carcass grades, and maternal ability of the progenies of potentially superior sires selected from various sources.

## III. PERSONNEL: C. E. Lindley and F. Hagan.

## IV. ACCOMPLISHMENTS DURING THE YEAR:

Weaning weights and grades were collected on calves sired by 9 Hereford, 5 Angus, one Shorthorn and 1 Charolais bull. The first five steer calves from six (6) bulls were fed for post weaning performance and carcass data.

The postweaning performance of the 5 steers was as follows by sire group.

	Weaning wt.	Final wt.	A.D.G. on feed*	Carcass grade	Yield grade	Carcass wt.	Loineye area	Loineye carcass per 100# wt.
Charolais	503	965	1.95	10.6	2.5	553	11.4	2.08
Angus x Hereford	478	922	1.87	12.0	3.2	563	11.8	2.09
Hereford (RCB Victor)	451	841	1.65	11.0	2.8	501	10.4	2.10
Hereford (Va. T2219)	475	901	1.80	10.7	3.4	540	11.1	2.06
Shorthorn (Va. 2289)	463	942	2.02	13.0	3.8	559	10.1	1.82
Angus (Tenn.994)	376	796	1.77	12.5	2.9	464	10.0	2.16

\*Includes 122 days on full grain feed and 115 days on a roughage ration.

Several other carcass measurements were made.

## V. FUTURE PLANS:

For the next several years testing the Virginia Angus lines will be emphasized. The first calves will be weaned in 1967. Some crossbreeding will be done.

## VI. PUBLICATIONS DURING THE YEAR:

Lindley, C. E., C. B. Shawver, L. J. Smithson and C. D. Edgar. 1967. Cross-breeding for Beef Production. 1967 Livestock Field Day Report.



Rogers, R. W., G. H. Howse and C. E. Lindley, 1966. Beef Tenderness as Affected by Marbling. 1966 Livestock Field Day Report.

VII. PUBLICATIONS PLANNED:

The Data is in the process of complete analysis for a technical bulletin.

## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Mississippi

Location		Prairie	Prairie	Prairie		
Breed of Sire		Angus	Hereford	Shorthorn		
Breed of Dam		Angus	Hereford	Shorthorn		
Line or Group <sup>1</sup>						
Percent used in project		100	60	80		
Inventory as of July 1, 1967	Cows 2 years and over	160	257	44		
	Yearling heifers	43	35	10		
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. Perf.	Percent pregnant <sup>2</sup>	75.2	77.3	79.2		
	Calf survival percent <sup>3</sup>	88.3	86.9	85.3		
Mean. Perf.	adj. ADG <sup>4</sup>	1.86	1.80	2.04		
	Av. Type sc. <sup>5</sup>	11.0	11.1	11.1		
Postweaning Performance	No. of bulls					
	No. of heifers					
	No. of steers	4	6	4		
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers	4	6	4		
Remarks						

- 1 - Purebreds, grade, line, sire number, crosses, treatment, etc.  
 2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.  
 3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.  
 4 - Indicate adjustments: Adjusted to steer basis.  
 5 - Suggest S-10 scoring system; indicate if different.



NORTH CAROLINA STATE UNIVERSITY  
Agricultural Experiment Station  
Raleigh, North Carolina

I. PROJECT: Animal Science 1010 (AH-d1-23 Rev. 2)

Genetic and Environmental Interactions for Performance and Carcass Traits in Beef Cattle.

II. OBJECTIVES:

- A. To evaluate the importance of sire-by-locations interaction for performance traits.
- B. To evaluate sire-by-locations and ration interaction for gain and carcass characteristics of steer progeny.
- C. To develop and evaluate selection criteria for the improvement of productive efficiency and market quality.

III. PERSONNEL:

E. U. Dillard, K. L. Koonce, J. E. Legates, W. T. Ahlschwede, J. A. Vesely and T. N. Blumer.

IV. ACCOMPLISHMENTS DURING THE YEAR:

Twenty bulls from the Raleigh herd were performance tested over a 140-day feeding period. The ration used was of the same formula as has been used since 1960. The results of this feeding trial are given in Table I.

Table I. Performance data for 1966 bull calves on 140-day postweaning feed test

Sire No.	No. of Progeny	Adj. 205-day Wt.	ADG on Feed	Final Grade
2002	11	361	2.89	8.5
3039	7	359	2.90	10.4
2630	2	317	2.63	7.5

At the four locations 219 calves were weaned which were eligible for the genotype-environment study. These calves were artificially sired except for a few instances in the Raleigh herd where natural services were used. The past year (1966) was exceptionally dry in some parts of the state and this is reflected in relatively light weaning weights for some of the herds.

The preweaning performance for the 1966 calves is given in Table II broken down by location and sire.

Table II. Preweaning performance of 1966 calves in genotype-environment study

Location	Sire No.	Sex	No.	Adj. 205-day Wt.	Type Score
Raleigh	2002	B	10	364	9.7
		H	16	365	9.3
	2630	B	3	289	8.0
		H	4	340	8.5
	3039	B	9	351	9.8
		H	11	359	9.2
Plymouth	2002	S	13	394	9.5
		H	9	408	9.8
	2630	S	11	365	9.6
		H	12	340	8.7
	3039	S	6	394	10.8
		H	4	402	10.2
Laurel Springs	2002	S	9	410	10.4
		H	12	415	9.7
	2630	S	12	413	10.4
		H	7	424	10.7
	3039	S	11	405	10.4
		H	8	441	10.7
Butner	2002	S	7	394	9.7
		H	9	378	9.4
	2630	S	12	366	9.9
		H	6	377	9.7
	3039	S	12	389	10.0
		H	6	372	9.8

A study designed to estimate the genetic and maternal relationships existing between birth weight, gestation length and preweaning growth in beef cattle utilized records on 1,323 calves produced at the four locations. Preliminary analysis revealed that sex and age of dam are significant sources of variation on preweaning growth and birth weight. Gestation length was significantly influenced by sex with males being carried 1.4 days longer than females. No sex by age of dam interaction was found for any of the traits. Heritability estimates utilizing paternal half sib and dam-offspring resemblances are given in Table III.



Table III. Heritability estimates for birth weight, gestation length, 210-day weight and average daily gain

<u>Trait</u>	<u>Paternal half-sib <math>h^2</math></u>	<u>Dam-offspring <math>h^2</math></u>
Birth Weight	0.76 $\pm$ 0.18	0.39 $\pm$ 0.15
Gestation Length	0.36 $\pm$ 0.14	0.47 $\pm$ 0.14
210-day Weight	0.16 $\pm$ 0.10	0.11 $\pm$ 0.18
Average Daily Gain	0.10 $\pm$ 0.10	0.03 $\pm$ 0.18

Genetic correlations based on the likeness of paternal half-sib are given in Table IV. These values suggest that selection emphasizing birth weight of the calf should be accompanied by increased 210 day weights and more rapid average daily gains. Furthermore, the sizeable genetic correlation between birth weight and gestation length suggests lengthened gestation periods as another correlated response.

Table IV. Genetic correlations between birth weight, gestation length, 210-day weight and average daily gain.

<u>Traits in Correlation</u>	<u>Genetic Correlation</u>
Birth Weight, Gestation	0.31 $\pm$ 0.17
Birth Weight, 210-day Weight	1.02 $\pm$ 0.16
Birth Weight, Average Daily Gain	0.91 $\pm$ 0.36
Gestation Length, 210-day Weight	0.35 $\pm$ 0.28
Gestation Length, Average Daily Gain	0.31 $\pm$ 0.36
210-day Weight, Average Daily Gain	0.97 $\pm$ 0.03

Knowledge of resemblances of (1) paternal half-sib families, (2) maternal half-sib families, (3) maternal grand sire families and (4) dam-offspring relationships were used in establishing sets of simultaneous equations to estimate maternal and environmental parameters associated with the four traits. For each of the traits the additively genetic maternal component was very large indicating that maternal influences are important sources of influence on these traits. The covariance between the genetic value for a trait and the genetic value for the maternal influence on the trait was negative for all of the traits studied. This is suggestive of an inherent buffering mechanism operating to maintain an optimum for a trait rather than allowing the accumulation of extensive deviations in either direction. Non-maternal environmental variances were small for birth weight and gestation length and relatively large for 210-day weight and average daily gain.

The covariance between the genetic values of the maternal components for birth weight and gestation was negative. This negative relationship implies that a maternal genotype which favors a heavier birth weight would be associated with a maternal genotype favoring a shorter gestation length. This would be beneficial in selection schemes emphasizing birth weight but where no increase in gestation length was desired.

V. FUTURE PLANS:

Steers produced in 1966 are currently being evaluated. This will be the last year in which data will be accumulated for the genotype-environment study. Analysis of the data collected over the last seven years is now in the initial stages.

Current plans call for herds at Raleigh and Plymouth to be used in a selection study. Each herd will be divided into three groups. One of the groups will be selected on preweaning gain, one on postweaning gain and one will be maintained as an unselected control. The first years of the project will be used to broaden the genetic base for future selection after which each group will be closed to outside breeding. Three sires will be used yearly in each of the selected lines while as many sires as practical will be used in the control line. The complete project proposal is now in the revision stage and should be available in the near future.

VI. PUBLICATIONS:

Koonce, K. L. and E. U. Dillard. 1967. Some environmental effects on birth weight and gestation length in Hereford cattle. J. Animal Sci. 26:205 (abstract)

Vaccaro, Rodolfo and E. U. Dillard. 1966. Relationship of dam's weight and weight changes to calf's growth rate in Hereford cattle. J. Animal Sci. 25:1063-1068.

VII. PUBLICATIONS PLANNED:

A publication is being prepared on the genetic, environmental and maternal relationships existing between birth weight, gestation length and preweaning growth rate.

Two manuscripts directly concerned with the genotype-environment study will be submitted. One will deal with preweaning performances, the other with postweaning performance and carcass characteristics.

VIII: COOPERATING AGENCIES: N.C. Department of Agriculture and N. C. Department of Mental Health.



## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State North Carolina

Location		Raleigh	Plymouth	Laurel Spgs.	Butner	
Breed of sire		Hereford	Hereford	Hereford	Hereford	
Breed of Dam		Hereford	Hereford	Hereford	Hereford	
Line or Group <sup>1</sup>		Purebred	Grade	Grade	Grade	
Percent used in project		100	100	60	100	
Inventory as of July 1, 1967	Cows 2 years and over	76	93	88	73	
	Yearling heifers	25	27	31	18	
	Bulls and steers under 1 year	29	37	31	31	
	Heifers under 1 year	25	33	32	21	
	Bulls over 1 year	1	0	0	0	
	Steers over 1 year	18	28	28	0	
	Percent pregnant <sup>2</sup>	70	82	65	75	
	Calf survival percent <sup>3</sup>	96	97	95	94	
	Adj. ADG <sup>4</sup>	1.40	1.48	1.69	1.53	
	Av. type sc. <sup>5</sup>	9.3	9.4	10.3	9.7	
Repro. Perf.						
Wean. Perf.						
Postweaning Performance	No. of bulls	20	0	0	0	
	No. of heifers	25	27	0	0	
	No. of steers	18	28	28	0	
Slaughtered	No. of bulls	17	0	0	0	
	No. of heifers	0	0	0	0	
	No. of steers	16	23	30	0	
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: Adjustments for sex and age of dam

5 - Suggest S-10 scoring system: indicate if different.

CLEMSON UNIVERSITY  
Agricultural Experiment Station  
Clemson, South Carolina

I. PROJECT: SC-479 (S-10)

The Response of Sire Progenies to Management and Feeding Procedures

II. OBJECTIVES:

To investigate the response of sire progenies, as measured by live animal and carcass traits to methods of producing slaughter cattle.

To evaluate the magnitude and importance of the average genotype with certain environmental influences.

To develop, through selection, herds of beef cattle with superior performance under South Carolina conditions.

III. PERSONNEL:

W. C. Godley, H. H. Pierce, G. C. Skelley, Jr., R. M. Rauton,  
R. R. Ritchie

IV. ACCOMPLISHMENTS DURING THE YEAR:

One hundred and twenty purebred Angus and 107 purebred Polled Hereford cows were put in the breeding herds to produce the 1966 calf crop. Two hundred and one of these cows conceived as determined by a pregnancy examination. This was the same conception rate as the previous year. Approximately 8% of the pregnant cows were sold prior to calving due to poor performance of their offspring. Seventeen of the 170 calves produced were born dead. This is a considerable increase over the 1965 calf crop but approximately the same as in 1964. The number of calves born dead was approximately the same in both breeds and both stations. The conception rate was slightly higher and the percent of calves weaned considerably higher at the Coast Station than at Clemson. The percent calf crop varied by sire groups from 54 to 81 at Clemson and from 63 to 83 at the Coast Station. Forty-two Angus and 15 Polled Hereford steers produced in the 1965 calf crop were fed on post weaning feeding tests. Comprehensive carcass information was obtained on these steers. Seven Angus and 3 Polled Hereford bull calves are being fed on pasture on a 140 day ROP feeding trial.

Data on 360 purebred Polled Hereford and Angus calves at the Simpson Experiment Station, Clemson and Coast Experiment Station, Summerville, S. C., were analyzed to evaluate the influence of sex and age of dam on birth weight, 210-day weight, and preweaning rate of gain. The



weight of 241 of these dams was taken the the time their calves were weaned, and the effect of their weight on the traits studied was estimated. The data were arranged into a set of normal equations, and least squares estimates of the various factors were computed.

Sex of calf and age of dam had significant influences on birth weight. Male calves were 5.07 pounds heavier at birth than heifers. Calves from 3-year-old cows, which in this study were calving for the first time, were lighter at birth than those from older cows. No significant difference was found between other age groups. When adjustment was made for weight of cow, differences due to age of cow were smaller.

Steer calves were 37.59 pounds heavier than heifers at 210-days of age. When weaning weight was adjusted for weight of cow to an 1,100-pound basis the difference was 40.34 pounds. Age of dam had a highly significant effect on 210-day weight of the calf. Maximum production was from 7, 8, 9, 10, and 12 and over cows. A small but negative relationship was found between cow weight and 210-day weight of the calf. A possible explanation is that the cow's weight was taken at the time her calf was weaned and the fatter cows were the heaviest. These fatter cows may have been the poorer milking cows, thus producing calves that were relatively light in weight at weaning.

Steer calves gained .16 pound more per day than heifers. Calves from older cows gained significantly more than those from younger cows. Adjustment for weight of cow indicated that some of the differences associated with age of dam may be accounted for by weight of cow.

Approximately 5 to 9 percent of the variation in weaning weight was attributable to weight at birth. Thus progress in improving weight at weaning by selecting heavier calves at birth would be extremely slow. The relationship, as measured by a simple correlation coefficient between birth weight and preweaning gain, was approximately .14.

#### V. FUTURE PLANS:

A new project is being initiated. The project statement will be submitted to The Technical Committee for approval as soon as possible.

#### VI. PUBLICATIONS DURING THE YEAR:

Godley, W. C., J. F. Wise and E. G. Godbey. 1966. Effects of Age of Dam and Sex of Calf on Birth and Weaning Weight of Beef Calves. S. C. Agr. Expt. Sta. Technical Bulletin 1023.

Hayden, T. E. Jr. 1966. Some Genetic and Environmental Factors Affecting Weaning and Postweaning Traits in Beef Cattle. Master's Thesis, Clemson University, Clemson, South Carolina.

Project - SC 479

Hayden, T. E., W. C. Godley, R. L. Edwards, and H. H. Pierce. 1967.  
Weaning and Postweaning Traits of Beef Cattle. J. Ani. Sci.  
Vol 26, 204 (abstract)

VII. PUBLICATIONS PLANNED:

A journal article or a technical bulletin on weaning and postweaning traits of beef cattle.

Submitted by:

W. C. Godley



## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State South Carolina

Location	Clemson	Clemson			
Breed of Sire	Angus	Hereford			
Breed of Dam	Angus	Hereford			
Line or Group <sup>1</sup>	Purebred	Purebred			
Percent used in project	100	100			
Inventory as of July 1, 1967	Cows 2 years and over	132	82		
	Yearling heifers	38	29		
	Bulls and steers under 1 year	44	28		
	Heifers under 1 year	41	20		
	Bulls over 1 year	14	9		
	Steers over 1 year	0	0		
Repro. Perf.	Percent pregnant <sup>2</sup>	77.4	86.7		
	Calf survival percent <sup>3</sup>	84	86.1		
Wean. Perf.	Adj. ADG <sup>4</sup>	1.9	1.6		
	Av. type sc. <sup>5</sup>	12.9	11.5		
Postweaning Performance	No. of bulls	6	3		
	No. of heifers	38	29		
	No. of steers	27	18		
Slaughtered	No. of bulls	0	0		
	No. of heifers	0	0		
	No. of steers	27	18		
Remarks					

- 1 - Purebreds, grade, line, sire number, crosses, treatment, etc.  
 2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.  
 3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.  
 4 - Indicate adjustment:  
 5 - Suggest S-10 scoring system: indicate if different.

UNIVERSITY OF TENNESSEE  
Agricultural Experiment Station  
Knoxville, Tennessee

I. PROJECT: Improvement of Producing Ability of Beef Cattle

II. OBJECTIVES:

1. To evaluate systematic breeding procedures.
2. To estimate genetic parameters and genetic environmental interactions of biological and economic traits.
3. To develop and evaluate selection criteria and selection procedures.
4. To determine the hereditary significance of recurring abnormalities.

III. PERSONNEL:

C. S. Hobbs, R. R. Shrode, W. L. Brown, J. A. Odom, J. H. Felts,  
R. A. Reynolds.

IV. ACCOMPLISHMENTS DURING THE YEAR:

Birth weights and weights, type grades and condition scores at approximately 120 to 140 days of age and at weaning were recorded for 855 calves sired by 26 Hereford bulls at six locations and 38 Angus bulls at five locations during the calendar year 1966. Although a revision of the project is planned which will exclude from the Tennessee S-10 contributing project several herds which have been included, data comparable to those enumerated above will continue to be processed by the same routine procedures as are applied to data from the S-10 contributing herds. All data collected from research herds of the Tennessee Agricultural Experiment Station will be available for use in various statistical studies where applicable.

The collection of data on objective measures of eating quality of sample cuts from cattle implanted with diethylstilbestrol was completed.

The study of effects of inbreeding on various performance traits of 650 calves at the Plateau Experiment Station was completed. No significant influence of either inbreeding of the individual calf or of inbreeding of the dam was found. Adjustment of gain for variation in condition score was investigated and found to be a promising procedure for improving the accuracy of evaluation of calves at weaning.

Collection of fat thickness data (measured by sonoray machine) was continued in the cow herd at the Plateau Experiment Station.

V. FUTURE PLANS:

Analysis of accumulated data with special attention to condition score at weaning and its usefulness in improving the accuracy of predicting post-weaning performance will be given primary consideration.



Performance data from calves in the 1967 and 1968 calf crops will be recorded at 56-day intervals following weaning. Analyses will be directed toward assessing the magnitude of maternal effects and determination of the post-weaning age at which maternal effects become negligible.

VI. PUBLICATIONS DURING THE YEAR:

Butts, W. T., Jr. 1966. The effects of inbreeding on various performance traits of Angus calves. Ph.D. Dissertation, University of Tennessee, Knoxville, Tennessee.

Anderson, J. M., C. S. Hobbs, and J. A. Odom. 1966. Implanting nursing calves with stilbestrol. Tenn. Farm and Home Science Prog. Rpt. 57.

VII. PUBLICATIONS PLANNED:

1. Condition score at weaning as a measure of maternal ability.
2. Reproductive patterns in various selected and unselected herds of beef cattle.
3. Effect of initial condition and wintering level of cows on the performance of calves.
4. Effect of change in cow condition on performance of calves during grazing season.
5. Comparison of rations for the superior sire evaluation program.
6. Comparisons of methods for developing two-year-old bulls.

## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Tennessee

Location		T E S		P E S		Oak Ridge
Breed of Sire		Hereford		Angus		Hereford
Breed of Dam		Hereford		Angus		Hereford
Line or Group <sup>1</sup>		Purebred		Purebred		Grade
Percent used in project		---		---		---
Inventory as of July 1, 1967	Cows 2 years and over	61		223		191
	Yearling heifers	17		68		---
	Bulls and steers under 1 year	22		92		71
	Heifers under 1 year	33		96		89
	Bulls over 1 year	4		80		8
	Steers over 1 year	---		---		---
Repro. Perf.	Percent pregnant <sup>2</sup>	96.8		88.6		82.9
	Calf survival percent <sup>3</sup>	98.4		91.4		95.8
Wean. Perf.	Adj. ADG <sup>4</sup>	1.85		1.98		1.93
	Av. type sc. <sup>5</sup>	11.3		12.2		11.1
Postweaning Performance	No. of bulls	9		86		---
	No. of heifers	28		71		---
	No. of steers	---		---		---
Slaughtered	No. of bulls	---		---		---
	No. of heifers	---		---		---
	No. of steers	---		---		---
Remarks						

- 1 - Purebreds, grade, line, sire number, crosses, treatment, etc.  
 2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.  
 3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.  
 4 - Indicate adjustment: Age of dam and sex of calf.  
 5 - Suggest S-10 scoring system; indicate if different.



TEXAS A and M UNIVERSITY  
Agricultural Experiment Station  
College Station, Texas

I. PROJECT: H-2102, Breeding Methods For Beef Cattle In The Southern Region.

II. OBJECTIVES:

To estimate genetic parameters and genetic-environmental interactions of biological and economic traits.

III. PERSONNEL:

T. C. Cartwright (leader), D. F. Weseli, N. M. Kieffer, and H. A. Fitzhugh, Jr.

IV. ACCOMPLISHMENTS DURING THE YEAR:

In specific S-10 studies involving several herds weight - age curves have been found to be relatively inflexible creating correlations among rates of gain and weights at different ages or stages of maturity. Individuals within breeds follow a more or less characteristic pattern for that breed. Angus cows were found to mature earlier than Hereford cows. Also, weight and age of dam tended to account for similar sources of variation in progeny gains (substantiating earlier work on this project) but the ratio of average daily gain per unit of dam weight was negatively related to dam weight in each herd.

Data from three experimental herds in Alabama, Georgia and Texas were included in another cooperative S-10 Southern Regional Study. Preweaning records of 1616 Angus and Hereford calves and postweaning feedlot data from 1052 individuals, from dams 2 to 12 years of age, were analyzed to evaluate their relation to post-partum weight of dam. Preweaning ADG of calves from dams that had raised all of their progeny was less than ADG of calves from dams of lesser fecundity. Also, dams that had raised all of their calves to weaning weighed less than cows that had not raised all of their progeny. Angus calves gained most rapidly from dams averaging 570 kg., whereas preweaning ADG of Hereford calves was maximum when dams averaged 600 kg. The relationship between preweaning ADG and dam weight was more curvilinear among Herefords. The effect of fecundity of dam on postweaning ADG tended to be inversely related to its influence on preweaning ADG. Postweaning ADG was positively but not significantly related to weight of dam. Partial linear regressions of postweaning ADG on dam weight were 0.03 and 0.02 kg. per 100 kg. increment in dam weight, respectively, for Angus and Hereford calves.

A study to determine genetic polymorphism of hemoglobin and transferrin types of beef cattle and the relationship of these traits to birthweight, yearling weight, average daily gain, and total gain on test was conducted using 232 purebred heifers and cows and 168 cross breeds at three Texas



Stations. Frequencies of the A and B hemoglobin alleles based on the observed phenotypes were 84.5% and 14.5% respectively. Angus were found to have only the A allele and the frequency of the A allele in Herefords and Brahmans was 98.9% and 46.5% respectively. Hemoglobin types were not significantly related to any of the production data studied. Angus and Herefords showed more transferrin heterozygotes than would be expected from the Hardy-Weinberg distribution, but the difference was not statistically significant. When breed effects were removed there was no significant association between transferrin type and any of the quantitative traits studied.

Variant milk proteins from individual cows were isolated. Significant variations of amino acid content from that reported on analogous proteins of dairy animals was found. This study is continuing and it is hoped that a simple and rapid technique for the detection of inherited milk protein variants can be developed.

Bisexuality in domestic cattle is dependent upon an established chromosomal system in which the two sexes differ in regard to the morphology of a single pair of chromosomes-the X and Y. In Bos taurus the centromere of the X chromosome is submedially located and is one of the largest chromosomes of the karyotype. The Y chromosome also has a submedial centromere, but is one of the smallest chromosomes in the karyotype. The Y chromosome of Bos indicus (Brahman or Zebu) differs morphologically from the Y chromosome of Bos taurus in that the centromere is telocentric and cannot be distinguished from the autosomes on the basis of shape. Females of both species have morphologically similar X chromosomes. Species origin of sires of males result from reciprocal crosses between Brahman and breeds of European descent was determined on the basis of Y chromosomes and the possible effect on fertility pose interesting questions about which presently only speculation can be made.

Whole blood cultures from a 1 month-old Brahman male calf were treated with tritiated thymidine during the latter part of the DNA synthesis period. The control cultures had an average of 0.37 broken chromosomes per cell, whereas the treated culture had an average of 3.70 broken chromosomes per cell. The chromosomal damage sustained due to the influence of  $\beta$  radiation was much greater than that reported for chromosomes of other species when treated similarly. In general, more of the large chromosomes of the karyotype were damaged than the small chromosomes. The X chromosome was damaged in only 13 of the 106 cells examined. These observations may indicate differential replication patterns of large vs. small; autosomal vs. sex chromosomes.

## V. FUTURE PLANS:

Selection indices for straightbreds will be developed properly taking into account overall effects of mature size so that logical economic decisions can be made concerning keeping heavier heifers at weaning for replacements or selling them for slaughter.



Work is continuing on the development of red blood typing reagents. It is hoped that a sufficient variety of reagents will have been developed so that routine typing can be initiated within the next year. A study to determine genetic variants of systematic enzymes of cattle and methods of detection of these enzymes will be initiated.

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I. PROJECT: H-2101, Breeding Methods For Beef Cattle In The Southern Region

II. OBJECTIVES:

To evaluate systematic breeding procedures.

To evaluate genetic parameters and genetic-environmental interactions of biological and economic traits.

III. PERSONNEL:

T. C. Cartwright (leader), W. E. Kruse, A. A. Melton, H. A. Fitzhugh, Jr., J. K. Riggs, H. O. Hill and G. T. King.

IV. ACCOMPLISHMENTS DURING THE YEAR:

In one study combining breeds in such a manner as to utilize discriminately the advantages of each breed and at once to create a hybrid vigor has been developed as an efficient breeding system resulting in calves approaching 1000 lb. at 365 days. This system, especially with developmental adjustments and improvements, compounds the economic advantages of both, gainability and hybrid vigor so that very substantial improvement of production efficiency results.

Analyses of feed efficiency data which are independent of intake indicate differences in feed conversion associated with sires. From multi-variate analyses residual (within sire-period subclasses) and sire-mean, correlations did not exceed 0.39. Heritability estimates for gain, independent of feed intake (efficiency of feed utilization), during four successive periods and for 32-week gain were 0.34, 0.41, 0.56, 0.63, and 0.64, respectively. Partial sire and residual correlations, independent of carcass weight, between 32-week gain and weights of loin, rib, round and rump, chuck and their sum were, -.15, -.10, -.17, 0.47, -.03, 0.63, 0.09, 0.46, -.06, respectively.

Optimal slaughter weights for steers produced by breeds of different sizes were found to vary considerably. For example, steers of breeds that gain 1.8 lb./day at 10 mo. (800 lb. mature) should be slaughtered at approximately 650 lb. to gain the maximum amount of beef for feed intake if the ratio of live weight sale price to price of feed is 10. Whereas, a steer of 3.5 lb. / day gain (1900 lb. mature wt.) would have an optimal slaughter weight of approximately 1300 lb. As the price ratio decreases slaughter weights decrease but to a lesser degree for cattle of slower rates of gain. These slaughter weights project up to 1600-1800 lb. for very high gainers in a favorable ratio (12+) situation. The immediate use of this research is to afford a basis for comparing efficiency of different breeds of cattle from the standpoint of return on investment as well as beef produced per unit of TDN.

V. FUTURE PLANS:

Developing specific systems of crossing; i.e., specific breeds; for (1) exploiting hybrid vigor, (2) utilizing gainability and (3) reducing

maintenance feed costs, (4) and increasing net fertility will continue. Particular new emphasis will be placed on evaluating hybrid cows from small parental breeds such as the Jersey and Angus. Selection indices for straightbreds will be developed properly taking into account the overall effects of mature size especially so that logical economic decisions can be made concerning keeping the heavier heifers at weaning for replacements or selling them for slaughter.

## VI. PUBLICATIONS:

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## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of Sire		H	H	A	A	B
Breed of Dam		H	H	A	A	B
Line or Group <sup>1</sup>		Purebred	Grade	Purebred	Grade	Purebred
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over	100	95	35	31	20
	Yearling heifers	17	9	7	-	2
	Bulls and steers under 1 year	37	46	14	17	6
	Heifers under 1 year	46	24	11	11	7
	Bulls over 1 year	24	-	6	-	7
	Steers over 1 year	-	21	-	-	-
Repro. Perf.	Percent pregnant <sup>2</sup>	84	85	93	-	80
	Calf survival percent <sup>3</sup>	79	80	96	-	72
Wean. Perf.	Adj. ADG <sup>4</sup>	1.9	1.9	2.2	-	1.9
	Av. type sc. <sup>5</sup>	None	-	-	-	-
Postweaning Performance	No. of bulls	9	-	14	-	4
	No. of heifers	27	28	12	-	9
	No. of steers	-	35	4	-	3
Slaughtered	No. of bulls	-	-	-	-	-
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving. 2 = Cows exposed on station at calving time.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments : Adj. to 180 days of age

5 - Suggest S-10 scoring system; indicate if different.

## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of Sire		L	G	BS	B	B
Breed of Dam		L	G	BS	4x	23x
Line or Group <sup>1</sup>		Purebred	Purebred	Purebred	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over	36	27	-	6	8
	Yearling heifers	7	2	-	-	-
	Bulls and steers under 1 year	14	11	-	-	1
	Heifers under 1 year	9	10	-	-	2
	Bulls over 1 year	15	5	2	-	-
	Steers over 1 year	-	-	-	-	-
Repro. perf.	Percent pregnant <sup>2</sup>	65	64	-	-	87
	Calf survival percent <sup>3</sup>	73	67	-	-	69
Mean. perf.	Adj. ADG <sup>4</sup>	2.4	2.4	-	-	2.0
	Av. type sc. <sup>5</sup>	None	-	-	-	-
Postweaning performance	No. of bulls	6	2	-	-	-
	No. of heifers	4	3	-	-	4
	No. of steers	-	-	-	-	3
Slaughtered	No. of bulls	-	-	-	-	-
	No. of heifers	-	-	-	-	-
	No. of steers	-	-	-	-	-
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving. 2 = Cows exposed and on station at calving time.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.



Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of Sire		B	L	L	L	L
Breed of Dam		24x	H	1x	15x	16x
Line or Group <sup>1</sup>		Grade	Grade	Grade	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over	1	4	6	2	7
	Yearling heifers	1	6	5	2	2
	Bulls and steers under 1 year	1	4	3	2	1
	Heifers under 1 year	2	5	3	2	1
	Bulls over 1 year					
	Steers over 1 year					
Repro. Perf.	Percent pregnant <sup>2</sup>	87	67	91	100	100
	Calf survival percent <sup>3</sup>	86	100	80	100	60
Wean. Perf.	Adj. ADG <sup>4</sup>	1.9	2.1	2.3	2.3	2.4
	Av. type sc. <sup>5</sup>	None	None	None	None	None
Postweaning Performance	No. of bulls					
	No. of heifers	3	6	6	2	2
	No. of steers	1	1	1	1	1
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.  
2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.  
3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.  
4 - Indicate adjustments:  
5 - Suggest S-10 scoring system; indicate if different.

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of Sire		L	L	C	L	G
Breed of Dam		76x	77x	1x	66x	H
Line or Group <sup>1</sup>		Grade	Grade	Grade	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over	3	1	2	2	6
	Yearling heifers	1	-	-	1	-
	Bulls and steers under 1 year	1	2	-	-	-
	Heifers under 1 year	1	1	-	1	-
	Bulls over 1 year					
	Steers over 1 year					
Repro. Perf.	Percent pregnant <sup>2</sup>	100	50	100	100	-
	Calf survival percent <sup>3</sup>	100	0	100	100	-
Wean. Perf.	Adj. ADG <sup>4</sup>	2.0	-	2.5	2.5	-
	Av. type sc. <sup>5</sup>	None	None	None	None	None
Postweaning Performance	No. of bulls					
	No. of heifers	2	-	1	2	-
	No. of steers	-	-	1	2	-
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

- 1 - Purebreds, grade, line, sire number, crosses, treatment, etc.
- 2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.
- 3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.
- 4 - Indicate adjustments:
- 5 - Suggest S-10 scoring system: indicate if different.



## State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of Sire		L	L	L	L	C
Breed of Dam		72x	82x	10x	47x	3x-5x-9x
Line or Group <sup>1</sup>		Grade	Grade	Grade	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over	1	2	4	1	3
	Yearling heifers	-	-	-	1	-
	Bulls and steers under 1 year	-	4	-	1	-
	Heifers under 1 year	-	1	-	-	1
	Bulls over 1 year					
	Steers over 1 year					
Repro. Perf.	Percent pregnant <sup>2</sup>	50	100	100	67	67
	Calf survival percent <sup>3</sup>	100	57	100	100	100
Wean. Perf.	Adj. ADG <sup>4</sup>	2.1	2.2	2.0	2.5	2.3
	Av. type sc. <sup>5</sup>	None	None	None	None	None
Postweaning Performance	No. of bulls					
	No. of heifers	-	1	-	1	-
	No. of steers	-	1	1	-	-
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of Sire		G	G	G	G	G
Breed of Dam		11x	32x	33x	34x	13x
Line or Group <sup>1</sup>		Grade	Grade	Grade	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over	21	7	1	-	4
	Yearling heifers	1	4	1	1	-
	Bulls and steers under 1 year	-	7	4	-	-
	Heifers under 1 year	-	1	-	1	-
	Bulls over 1 year					
	Steers over 1 year					
Repro. Perf.	Percent pregnant <sup>2</sup>	54	87	80	50	-
	Calf survival percent <sup>3</sup>	75	89	75	100	-
Wean. Perf.	Adj. ADG <sup>4</sup>	2.5	2.6	2.1	2.2	-
	Av. type sc. <sup>5</sup>	None	None	None	None	None
Postweaning Performance	No. of bulls					
	No. of heifers	1	10	1	1	-
	No. of steers	1	5	1	-	-
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.



## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of Sire		G	G	G	G	G
Breed of Dam		42x	43x	51x	52x	61x
Line or Group <sup>1</sup>		Grade	Grade	Grade	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over	1	1	2	-	4
	Yearling heifers	1	-	-	2	-
	Bulls and steers under 1 year	1	-	-	1	-
	Heifers under 1 year	2	1	-	-	-
	Bulls over 1 year					
	Steers over 1 year					
Repro. Perf.	Percent pregnant <sup>2</sup>	0	0	0	86	100
	Calf survival percent <sup>3</sup>	-	-	-	100	75
Wean. Perf.	Adj. ADG <sup>4</sup>	-	-	-	2.1	1.9
	Av. type sc. <sup>5</sup>	None	None	None	None	None
Postweaning Performance	No. of bulls					
	No. of heifers	2	-	-	3	-
	No. of steers	-	-	-	1	-
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system: indicate if different.

## Production, Inventory, and Performance Data, S-10 Herds 1966-1967

State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of Sire		BS	BS	BS	BS	A
Breed of Dam		H	58x	1x	57x	J
Line or group <sup>1</sup>		Grade	Grade	Grade	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over	7	-	28	-	3
	Yearling heifers	3	1	11	5	19
	Bulls and steers under 1 year	-	8	1	9	-
	Heifers under 1 year	-	6	3	5	1
	Bulls over 1 year					
	Steers over 1 year					
Repro. Perf.	Percent pregnant <sup>2</sup>	86	-	91	85	-
	Calf survival percent <sup>3</sup>	100	-	90	100	-
Wean. Perf.	Adj. ADG <sup>4</sup>	2.3	-	2.4	2.3	-
	Av. type sc. <sup>5</sup>	None	None	None	None	None
Postweaning Performance	No. of bulls					
	No. of heifers	6	-	11	5	-
	No. of steers	5	-	1	1	-
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.



State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of Sire		G	G	H	H	BS
Breed of Dam		62x	53x	41x	58x	32x
Line or Group <sup>1</sup>		Grade	Grade	Grade	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over					
	Yearling heifers					
	Bulls and steers under 1 year	3	1	2	2	3
	Heifers under 1 year	1	-	3	4	6
	Bulls over 1 year					
	Steers over 1 year					
Repro. Perf.	Percent pregnant <sup>2</sup>					
	Calf survival percent <sup>3</sup>					
Wear. Perf.	Adj. ADG <sup>4</sup>					
	Av. type sc. <sup>5</sup>					
Postweaning Performance	No. of bulls					
	No. of heifers	-	-	-	1	-
	No. of steers	2				
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.

## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Texas

Location		McGregor,	McGregor	McGregor	McGregor	McGregor
Breed of Sire		A	BS	H	L	L
Breed of Dam		1x	A	B	58x	11x
Line or group <sup>1</sup>		Grade	Grade	Grade	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over					
	Yearling heifers					
	Bulls and steers under 1 year	8	1	3	4	3
	Heifers under 1 year	6	2	7	7	2
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant <sup>2</sup>					
	Calf survival percent <sup>3</sup>					
Mean. Perf.	Adj. ADG <sup>4</sup>					
	Av. type sc. <sup>5</sup>					
Postweaning Performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system; indicate if different.



State Texas

Location		McGregor	McGregor	McGregor	McGregor	McGregor
Breed of Sire		L	G	H	L	C
Breed of Dam		48x	41x	16x	A	C
Line or Group <sup>1</sup>		Grade	Grade	Grade	Grade	Grade
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over					
	Yearling heifers					
	Bulls and steers under 1 year	1	1	3	4	5
	Heifers under 1 year	-	-	1	4	2
	Bulls over 1 year					
	Steers over 1 year					
Repro. Perf.	Percent pregnant <sup>2</sup>					
	Calf survival percent <sup>3</sup>					
Wean. Perf.	Adj. ADG <sup>4</sup>					
	Av. type sc. <sup>5</sup>					
Postweaning Performance	No. of bulls					
	No. of heifers					
	No. of steers					
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S-10 scoring system: indicate if different.

State Texas

Location		McGregor				
Breed of Sire		H				
Breed of dam		57x				
Line or group <sup>1</sup>		Grade				
Percent used in project		100				
Inventory as of July 1, 1967	Cows 2 years and over					
	Yearling heifers					
	Bulls and steers under 1 year					
	Heifers under 1 year					
	Bulls over 1 year					
	Steers over 1 year					
Repro. perf.	Percent pregnant <sup>2</sup>					
	Calf survival percent <sup>3</sup>					
Mean. Perf.	Adj. ADG <sup>4</sup>					
	Av. type sc. <sup>5</sup>					
Postweaning Performance	No. of bulls					
	No. of heifers	8				
	No. of steers	2				
Slaughtered	No. of bulls					
	No. of heifers					
	No. of steers					
Remarks						

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent or percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments:

5 - Suggest S- 10 scoring system; indicate if different.



CATTLE BREED and CROSS CODES

Breed or Cross	Dam Breeding	Sire Breeding	Progeny Breeding
A	Angus	Angus	Angus
B	Brahman	Brahman	Brahman
BA	Brangus	Brangus	5/8 A - 3/8 B
BM	Beefmaster	Beefmaster	S - H - B
BS	Brown Swiss	Brown Swiss	Brown Swiss
C	Charbray	Charbray or Charolais	3/4, 7/8 L - 1/4, 1/8 B
G	Santa Gertrudis	Santa Gertrudis	Santa Gertrudis
H	Hereford	Hereford	Hereford
I	Holstein	Holstein	Holstein
J	Jersey	Jersey	Jersey
L	Charolais	Charolais	Charolais
R	Red Poll	Red Poll	Red Poll
RA	Red Angus	Red Angus	Red Angus
RB	Red Brangus	Red Brangus	Red Brangus
S	Shorthorn	Shorthorn	Shorthorn
U	Sussex	Sussex	Sussex
1x	Hereford	Brahman	1/2 H - 1/2 B
2x	Brahman	Hereford	1/2 B - 1/2 H
3x	1x and 2x	Hereford	3/4 H - 1/4 B
4x	1x	Brahman	3/4 B - 1/4 H
5x	3x and 9x	Hereford	7/8 B - 1/8 B
6x	Angus breeding, predominate		
7x	Brahman	1x and 2x	3/4 B - 1/4 H

\*1 = E - Elig. for registration.

\*2 = N - Not eligible for registration or record only in the association.

\*3 = O - Horns.

\*4 = P - Polled.

8x	4x and 23x	Hereford	5/8 H - 3/8 B
9x	Hereford	1x and 2x	3/4 H - 1/4 B
10x	3x, 5x and 9x	Charolais	5/8 L - 3/8 H
11x	Hereford	Santa Gertrudis	1/2 H - 1/2 G
12x	Hereford	Red Poll	1/2 H - 1/2 R
13x	1x	Santa Gertrudis	1/2 G - 1/4 H - 1/4 B
14x	1x	Red Poll	1/2 RP - 1/4 H - 1/4 B
15x	Hereford	Charolais	1/2 H - 1/2 L
16x	1x and 2x	Charolais	1/2 L - 1/4 H - 1/4 B
17x	Charbray	Hereford	1/2 C - 1/2 H
18x	Santa Gertrudis breeding, predominate		?
19x	Brahman breeding, predominate		?
20x	Charolais or Charbray breeding, predominate		?
21x	1x	1x and 2 x	1/2 H - 1/2 B (inter se)

Breed or Cross	Dam Breeding	Sire Breeding	Progeny Breeding
22x			
23x	4x	Brahman	7/8 B - 1/8 H
24x	23x	Brahman	15/16 B - 1/16 H
25x	24x	Brahman	31/32 B - 1/32 H
26x	Hereford	Charbray	1/2 H - 7/16 L - 1/16 B
27x	26x	Charolais	3/4 L - 1/4 H
28x	27x	Charolais	7/8 L - 1/8 H
29x	28x	Charolais	15/16 L / 1/16 H
30x			
31x			
32x	11x	Santa Gertrudis	3/4 G - 1/4 H
33x	32x	Santa Gertrudis	7/8 G - 1/8 H
34x	33x	Santa Gertrudis	15/16 G - 1/16 H
35x			
36x	Brahman	Charbray	9/16 B - 7/16 L
37x	36x	Charolais	3/4 L - 1/4 B
38x	37x	Charolais	7/8 L - 1/8 B
39x	38x	Charolais	15/16 L / 1/16 B
40x			
41x			
42x	13x	Santa Gertrudis	3/4 G - 1/8 H - 1/8 B
43x	42x	Santa Gertrudis	7/8 G - 1/16 H - 1/16 B
44x	43x	Santa Gertrudis	15/16 G - 1/32 H - 1/32 B
45x	58x	Hereford	3/4 H - 1/4 BS
46x	58x	Brown Swiss	3/4 BS - 1/4 H
47x	10x	Charolais	13/16 L - 3/16 H
48x	47x	Charolais	29/32 L - 3/32 H
49x			
50x			
51x	Red Poll	Santa Gertrudis	1/2 R - 1/2 G
52x	51x	Santa Gertrudis	3/4 G - 1/4 R
53x	52x	Santa Gertrudis	7/8 G - 1/8 R
54x	53x	Santa Gertrudis	15/16 G - 1/16 R
55x			
56x	B	Brown Swiss	1/2 B - 1/2 BS
57x	1x	Brown Swiss	1/2 BS - 1/4 H - 1/4 B
58x	H	Brown Swiss	1/2 BS - 1/2 H
59x	57x	Hereford	1/4 BS - 5/8 H - 1/8 B
60x	57x	Brown Swiss	3/4 BS - 1/8 H - 1/8 B
61x	14x	Santa Gertrudis	1/2 G - 1/4 R - 1/8 H - 1/8 B
62x	61x	Santa Gertrudis	3/4 G - 1/8 R / 1/16 H - 1/16 B
63x	62x	Santa Gertrudis	7/8 G - 1/16 R - 1/32 H / 1/32 B
64x	63x	Santa Gertrudis	15/16 G - 1/32 R - 1/64 H - 1/64 B
65x			
66x	1x and 2x	Charbray	7/16 L - 1/4 H - 5/16 B
67x	66x	Charolais	3/4 L - 1/8 H - 1/8 B



Breed or Cross	Dam Breeding	Sire Breeding	Progeny Breeding
68x	67x	Charolais	7/8 L - 1/16 H - 1/16 B
69x	68x	Charolais	15/16 L - 1/32 H - 1/32 B
70x			
71x	15x	Charbray	11/16 L - 1/4 H - 1/16 B
72x	15x	Charolais	3/4 L - 1/4 H
73x	72x	Charolais	7/8 L - 1/8 H
74x	73x	Charolais	15/16 L - 1/16 H
75x			
76x	3x, 5x, and 9x	Charbray	7/16 L - 3/8 H - 3/16 B
77x	76x	Charolais	3/4 L - 3/16 H - 1/16 B
78x	77x	Charolais	7/8 L - 3/32 H - 1/32 B
79x	78x	Charolais	15/16 L - 3/64 H - 1/64 B
80x			
81x	16x	Charbray	15/32 L - 1/4 H - 9/32 B
82x	16x	Charolais	3/4 L - 1/8 H - 1/8 B
83x	82x	Charolais	7/8 L - 1/16 H - 1/16 B
84x	83x	Charolais	15/16 L - 1/32 H - 1/32 B
85x			
86x	13x	Charbray	7/16 L - 1/4 G - 1/8 H - 3/16 B
87x	86x	Charolais	3/4 L - 1/8 G - 1/32 H 3/32 B
88x	87x	Charolais	7/8 L - 1/16 B - 1/64 H 3/64 B
89x	88x	Charolais	15/16 L - 1/32 G - 1/128 H - 3/128 B
90x	89x	Charolais	
91x	Brahman	Charolais	1/2 L - 1/2 B
92x	91x	Charolais	3/4 L - 1/4 B (Charbray)
93x	92x	Charolais	7/8 L - 1/8 B (Charbray)
94x	93x	Charolais	15/16 L - 1/16 B
95x	Coop. cattle		5/8 L - 1/4 B - 1/8 S
96x	Coop. cattle		1/4 R - 1/4 B - 1/8 H - 1/8 J
97x	Coop. cattle		3/4 H - 1/4 B (approx.)
98x	Coop. cattle		R - B
99x	Coop. cattle		B - J
100x			
101x			
102x			
103x			
104x			
105x			
106x			
107x			
108x			
109x			
110x			
111x			
112x			
113x			

VIRGINIA POLYTECHNIC INSTITUTE  
Animal Science Department  
Blacksburg, Virginia

I. PROJECT: Hatch 345011. Line Project No. AH dl-7 (Rev. 2)  
Heterosis from Crosses among British Breeds of Cattle.

II. OBJECTIVES:

To measure heterosis obtained from crosses among the Angus, Hereford, and Shorthorn breeds, as shown by growth rate, fattening ability, and carcass quality.

To measure productive ability of crossbred versus purebred dams.

III. PERSONNEL:

J. A. Gaines, W. H. McClure, R. C. Carter, G. W. Litton, and  
F. S. McClaugherty.

IV. ACCOMPLISHMENTS DURING THE YEAR:

The fourth calf crop in phase two was born approximately January to April of 1966, and weaned in October of 1966. After an adjustment period, the calves were put on full feed in groups in dry lot on fattening rations.

This year's report will be a summary of phase two to date, in order to render a more comprehensive report that may be a source of information to other entities.

The objective of phase two of this experiment is to compare the productivity of purebred and crossbred cows in terms of percentage calf crop born and weaned, birth and weaning weights of the calves, as well as their post-weaning performance. The cow herd, consisting of sixty purebreds (Angus, Hereford, and Shorthorn), and sixty crossbreds (reciprocal two-breed crosses) among these breeds, was purchased as calves in 1960. Contracts were made with six breeders to mate a random one-half of each herd to a bull of a different breed and half to a bull of the same breed. Thus both purebred and crossbred heifers came from each of six herds.

The heifers were bred first, as two-year-olds, in 1962. Six bulls were used the first year; twelve bulls were used the second, third and fourth years. Bulls used each year were two purebreds of each of the Angus, Hereford, and Shorthorn breeds, and two crossbreds of each of the crosses Angus x Hereford, Angus x Shorthorn, and Hereford x Shorthorn (or the reciprocals). The crossbred bulls were bred to the purebred cows and the purebred bulls were bred to the crossbred cows. Thus all calves were either three-breed or backcrosses. All bull calves were castrated soon after birth.

This report is based on results from four calf crops. The total number of matings involved is 475. The average birth date of 223 calves from purebred dams was 18 Feb.; it was 15 Feb. for 225 calves from crossbred



dams (Table 1). Bull calves from purebred dams weighed 32.4 kg. at birth; those from crossbred dams weighed 34.1 kg. Heifer calves from purebred dams weighed 31.2 kg. at birth; those from crossbred dams weighed 31.8 kg. From 238 matings of purebred cows, 93.7% calved and 89.0% weaned calves; from 237 matings of crossbred cows, 94.9% calved and 89.4% weaned calves (Tables 2 and 3).

Steers from purebred dams weighed 195.3 kg. at weaning; those from crossbred dams weighed 204.1 kg. Heifers from purebred dams weighed 189.1 kg.; those from crossbred dams weighed 197.7 kg. (Table 4). Feeder grade at weaning was choice minus for all groups (Table 5).

With respect to post-weaning performance, 102 steers from purebred dams gained 974 gm./day on full feed, graded choice minus alive before slaughter, and graded choice plus in the carcass. The slaughter weight of these steers was 411.7 kg., the carcass weight was 245.6 kg., and the dressing percent was 59.9. The 98 steers from crossbred dams gained 1 kg./day on feed and graded choice minus before slaughter and in the carcass; their slaughter weight was 428.5 kg., carcass weight was 255.0 kg., and dressing percent was 59.6 (Tables 6 and 8).

Ninety-three heifers from purebred dams gained 860 gm./day on feed, and graded choice minus before slaughter and in the carcass; their slaughter weight was 341.3 kg., carcass weight was 200.8 kg., and dressing percent was 58.7. Ninety heifers from crossbred dams gained 870 gm./day on feed, and graded choice minus before slaughter and in the carcass; their slaughter weight was 350.4 kg., carcass weight was 206.7 kg., and dressing percent was 59.0 (Tables 7 and 9).

Tentative conclusions at this time are: (1) no difference between purebred and crossbred cows in percent calves weaned (when the calves are crossbred), (2) weaning weights of steer calves were 8.8 kg. and weaning weights of heifer calves were 6.6 kg. in favor of crossbred dams, (3) steer calves from crossbred dams weighed 16.8 kg. more at time of slaughter and had heavier carcasses by 9.4 kg., when compared to steers from purebred cows, (4) heifer calves from crossbred dams weighed 9.1 kg. more at time of slaughter and had heavier carcasses by 5.9 kg., when compared to heifer calves from purebred cows. Other differences were small.

#### V. FUTURE PLANS:

Phase two will be concluded with the slaughter of the fifth calf crop, which is due to take place in the summer of 1968. Bulls for phase three have been produced, and are now on test. Contract matings will be arranged in the near future.

Table 1. Birth Dates and Weights

Breeding of Dams	No. of Calves	Av. Birth Date	Av. Birth Weight, kg.	
			Males	Females
Purebred	223	18 Feb.	32.4	31.2
Crossbred	225	15 Feb.	34.1	13.8
Difference		3 days	1.7	0.6

Table 2. Matings, Calves Born and Calves Alive  
at 36 Hours

Breeding of Dams	Matings	Calves Born		Alive at 36 Hours
		No.	%	
Purebred	238	223	93.7	221
Crossbred	237	225	94.9	220
Difference		2	1.2	1

Table 3. Calves Weaned of Cows Mated

Breeding of Dams	Matings	Calves Weaned	Calves Weaned of Cows Mated, %
Purebred	237	211	89.0
Crossbred	236	211	89.4
Difference			0.4

Table 4. Ages and Weaning Weights

Breeding of Dams	Av. Age at Weaning	Weaning Weight, kg.	
		Steers	Heifers
Purebred	231 days	195.3	189.1
Crossbred	233 days	204.1	197.7
Difference	2	8.8	6.6



Table 5. Feeder Grade at Weaning

Breeding of Dams	Feeder Grade	
	Steers	Heifers
Purebred	11.7	12.0
Crossbred	12.0	12.0
Grade Code: Choice, 12; Good Plus, 11.		

Table 6. Post-Weaning Data on Steers

Breeding of Dams	No. Fed	Daily Gain, gm.	Slau. Grade	Carcass Grade
Purebred	102	974	12.1	12.7
Crossbred	98	1001	12.2	11.9
Grade Code: Choice Plus, 13; Choice, 12.				

Table 7. Post-Weaning Data on Heifers

Breeding of Dams	No. Fed	Daily Gain, gm.	Slau. Grade	Carcass Grade
Purebred	93	860	11.9	11.7
Crossbred	90	870	12.1	11.7
Grade Code: Choice, 12; Good Plus 11.				

Table 8. Post-Weaning Data on Steers

Breeding of Dams	No. Fed	Slaughter Weight, kg.	Carcass Weight, kg.	Dressing Percent
Purebred	102	411.7	245.6	59.9
Crossbred	98	428.5	255.0	59.6
-----				
Difference		16.8	9.4	0.3

Table 9. Post-Weaning Data on Heifers

Breeding of Dams	No. Fed	Slaughter Weight, kg.	Carcass Weight, kg.	Dressing Percent
Purebred	93	341.3	200.8	58.7
Crossbred	90	350.4	206.7	59.0
<hr/>				
Difference		9.1	5.9	0.3

## VI. PUBLICATIONS DURING THE YEAR:

Gaines, J. A., W. H. McClure and R. C. Carter. 1966. Purebred versus crossbred cows of three beef breeds. (abstract). J. Animal Sci. 25:878-879.

Leonard, B. E., R. C. Carter, J. A. Gaines and W. H. McClure. 1967. Maternal differences among reciprocal crossbred cows. (abstract). J. Animal Sci. 26:205

Vogt, D. W., J. A. Gaines, R. C. Carter, W. H. McClure and C. M. Kincaid. 1967. Heterosis from crosses among British breeds of beef cattle: post-weaning performance to slaughter. J. Animal Sci. 26:443-452.

## VII. PUBLICATIONS PLANNED:

Gaines, J. A., G. V. Richardson, W. H. McClure, D. W. Vogt and R. C. Carter. 1967 (?). Heterosis from crosses among British breeds of beef cattle: carcass characteristics. J. Animal Sci. (in press).

Submitted by:

J. A. Gaines



Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

Phase 2, Fourth Calf Crop

State Virginia, Project 345011

Location		Shenandoah	Val. Res.	Station,	Steeles Tavern, Va.
Breed of sire		Purebred	Purebred	Crossbred	Crossbred
Breed of Dam		Crossbred	Crossbred	Purebred	Purebred
Line or Group <sup>1</sup>		Backcross	3-breed cr.	Backcross	3-breed cr.
Percent used in project		90	90	90	90
Inventory as of July 1, 1967	Cows 2 years and over	29	29	29	29
	Yearling heifers	0	0	0	0
	Bulls and steers under 1 year	13	12	12	12
	Heifers under 1 year	10	11	13	13
	Bulls over 1 year	3	3	3	3
	Linecross bulls for phase three: a total of eleven (11) Crossbred bulls for phase three: a total of thirteen (13)				
Repro. Perf.	Steers over 1 year	0	0	0	0
	Percent pregnant <sup>2</sup>	89.7	96.6	93.1	96.6
	Calf survival percent <sup>3</sup>	88.5	82.1	92.6	89.3
Wean. Perf.	Adj. ADG <sup>4</sup>				
	Av. type sc <sup>5</sup>				
Postweaning Performance	No. of bulls				
	No. of heifers	PLEASE SEE ATTACHED REPORT			
	No. of steers				
Slaughtered	No. of bulls				
	No. of heifers				
	No. of steers				
Remarks					

- 1 - Purebreds, grade, line, sire number, crosses, treatment, etc.
- 2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.
- 3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.
- 4 - Indicate adjustments:
- 5 - Suggest S-10 scoring system; indicate if different.

VIRGINIA POLYTECHNIC INSTITUTE  
Department of Animal Science

I. PROJECT: S-031-8 (S-10)

Evaluation of the Effectiveness of Selection for Economic Traits in Beef Cattle

II. OBJECTIVES:

To obtain estimates of genetic parameters from field data to include:

- a. heritability and repeatability of traits,
- b. phenotypic and genetic correlations, and
- c. construction of selection indexes.

To study the effects of location on performance records and on adjustment factors needed.

To determine the minimum gains required to obtain measurable genetic difference among animals.

To study the factors influencing performance and sale price of ROP bulls.

To evaluate the effectiveness of selection on the improvement of beef cattle under farm conditions.

III. PERSONNEL:

T. J. Marlowe, R. R. Schalles, D. W. Vogt, and T. N. Meacham

IV. ACCOMPLISHMENTS DURING THE YEAR:

Under Objective 5, procedure III, a study was completed on the genetic and environmental changes in a herd of approximately 350 purebred Angus cows over an 11-year period. The objective was to attempt to separate and estimate the magnitude of the separate portions of the total phenotypic change as measured by calf gains and grades. Records were available on 2,638 calves by 769 cows, 2,604 of them by 43 sires. Two methods were used. One method was based on the assumption that changes between half-sibs in successive years is due to one-half of the genetic change plus all of the environmental change ( $1/2 g+t$ ). The second method was the use of repeat matings, in which it was assumed that the differences between full-sibs in different years were due entirely to environmental changes.

The two methods of estimating environmental changes in gains gave drastically different results. By the paternal half-sib method the environmental contribution to ADG increased over the 11-year period, but when estimated by the repeat mating method the regression coefficient was negative and twice the magnitude of that obtained by the paternal half-sib method.



A direct estimate of the genetic change was obtained by the half-sib method, whereas, a direct estimate of the environmental change was obtained by the repeat mating method. In both cases the change estimated directly followed more closely the phenotypic change which was negative. Such large discrepancies did not occur when estimating the change in grade. The environmental change was negative and the genetic change was positive by both methods. Selection differentials were positive for both ADG and grade in all years, averaging 0.06 lbs. per day per year for ADG and 0.6 grade point per year for grade. Selection of sires was based on grade without the use of performance records.

The second calf crop (under objective 5, procedure II) of 60 calves by 15 sires are on the ground. Approximately 80 cows are rebred artificially with the semen from 12 Culpeper ROP Hereford bulls. The objective is to obtain contemporary progenies of two groups of Culpeper ROP bulls with birth dates differing by five or more years in an attempt to measure the progress in Hereford herds that have been in the performance testing program for several years. Semen was collected from an additional 25 bulls for similar comparisons.

Reproductive patterns were studied in a herd of approximately 350 purebred Angus cows (1) to evaluate the age of cow at first calving, regularity of calving, length of interval between calves, and calf performance; (2) to determine the effect that these factors had on length of time cows remained in the herd; and (3) to estimate the heritability and repeatability of calving interval, preweaning gains and weanling grade. Three thousand nine hundred eighty-nine calving records were available for 769 cows. During the 11-year period studied (1955-1965), an average annual calf crop of 89% was born and 87% weaned. Average age at first calving was 32 months and 12 days and average calving interval was 370 days, with 0.20 of a calf skipped by 626 cows having more than one calf. During the first 8 years, 46 % of the heifers produced were kept for replacement.

Table 1 shows the means, partial regression coefficients and level of significance of several factors on age of cow when culled. Repeatability and heritability estimates for calving interval, preweaning gains and weanling grades are shown in Table 2.

TABLE 1. MULTIPLE REGRESSION COEFFICIENTS ON AGE  
OF COW WHEN CULLED<sup>a</sup>

Factor	Mean	Regression Coef.	t-value
Age at 1 <sup>st</sup> calving	2.8	0.27 ± .24	1.164
Calving interval	0.91	3.89 ± .54	7.170 **
ADG of offspring	1.69	2.38± 1.09	2.184 **
Grade of offspring	11.5	-.53± .15	-3.589 **
Age when culled	8.52		

<sup>a</sup> 390 observations  
\*\*P < .01

TABLE 2. HERITABILITY AND REPEATABILITY OF PREWEANING AVERAGE DAILY GAIN, WEANING TYPE SCORE AND CALVING INTERVAL

Trait	Heritability	Repeatability
Weaning type score	0.31 $\pm$ .02	0.24 $\pm$ .03
Preweaning ADG	0.57 $\pm$ .09	0.18 $\pm$ .02
Calving interval	0.03 $\pm$ .20	0.02 $\pm$ .01

## V. FUTURE PLANS:

Continuation of comparisons of contemporary progenies of Culpeper ROP bulls in both the Angus and Hereford breed until sufficient data are accumulated to determine the genetic progress being made in these BCIA herds. Complete the study now under way on factors influencing the sale price of the Culpeper tested bulls.

## VI. PUBLICATIONS DURING THE YEAR:

Marlowe, T. J. and G. A. Morrow, 1967. What bull buyers spend their money for. Livestock Research Report 1966-67. V.P.I. Research Div. Report 122:82-85.

Marlowe, T. J. and G. A. Morrow, 1967. Factors influencing the sale price of ROP bulls. J. Animal Sci. 26:205 (abstract).

Morrow, G. A. and T. J. Marlowe, 1966. Genetics of mature traits in Angus cows. J. Animal Sci. 25:880 (abstract).

Morrow, G. A. and T. J. Marlowe, 1966. Heritability of and genetic relationships among weight, grade and condition of Angus cows. Livestock Research Progress Report 1965-66. Va. Agr. Expt. Sta. pp. 39-41.

Schalles, R. R., 1966. Reproductive and Genetic Patterns in a Herd of Angus Cows. Ph.D. Dissertation, Virginia Polytechnic Institute.

Schalles, R. R. and T. J. Marlowe, 1967. Reproductive patterns in a herd of Angus cows. Livestock Research Report 1966-67. V.P.I. Research Div. Report 122: 1-4.

Schalles, R. R. and T. J. Marlowe, 1967. Genetic and environmental changes in a herd of Angus cows. Livestock Research Report 1966-67. V.P.I. Research Div. Report 122:5-10.

Vogt, D. W. and T. J. Marlowe, 1966. A further study of the genetic parameters involving preweaning growth rate and weaning grade in beef calves. J. Animal Sci. 25:74 (abstract).



BEEF CATTLE RESEARCH STATION  
Front Royal, Virginia

I. PROJECT: AH 150.16, AH Line Project dl-4 (S-10)

The Improvement of Beef Cattle for Virginia Through Breeding Methods

II. OBJECTIVES:

The objectives of this investigation are:

1. To compare changes in performance and breeding values from two breeding systems: (a) single trait mass selection, and (b) the formation of intensely inbred lines for subsequent use in top and rotational crossing.
2. To evaluate selection criteria and procedures and to develop more precise and effective measures of quality and performance in beef cattle.
3. To simplify methods of individual, progeny, and sib testing so that the performance of breeding cattle can be evaluated at young ages.

III. PERSONNEL:

B. M. Priode, K. P. Bovard, R. C. Carter, and E. J. Warwick.

IV. ACCOMPLISHMENTS DURING THE YEAR:

1 - Scope and nature of work undertaken

(a) Topcross testing of the six Angus lines -- four inbred and two selection -- was continued in cooperation with the Mississippi Station. Similar testing of the six Shorthorn lines was continued with the Blacksburg (Virginia) Station.

(b) Thirty-six inbred cows from the six inbred lines in last year's partial diallel tests were included in an extension of that test. The special matings were made to produce line - and breed - cross bulls of known genetic constitution for later use in crossbreeding studies.

(c) Studies of the importance of DDT in wet apple pomace silage were continued. Results will be reported later when complete.

(d) Heptachlor residue studies were initiated with 24 pregnant cows in November 1966. The work is to be completed in November 1967.

2 - Research results

(a) Selection lines are different. Estimates of the differences between the selection lines in traits measuring both type and growth are presented separately for Angus and Shorthorns below. Most differences were statistically significant; results are from 316 Angus calves, 286 Shorthorns. Absolute differences are slightly larger in Angus than in Shorthorns as shown in Table 1 below.

Table 1.

Angus and Shorthorn selection line comparisons, i.e., L. S. Means, 1950-63,  
Beef Cattle Research Station, Front Royal, Virginia.

Breed/line	Type scores <sup>b</sup>			Weights, lbs., at			ADG, lb./day		
	<u>Birth</u>	<u>Mids.</u>	<u>Fall</u>	<u>Birth</u>	<u>Mids.</u>	<u>Fall</u>	<u>Mids.</u>	<u>Fall</u>	<u>M/F</u> <sup>c</sup>
A-7 Type	10.6	11.9	12.4	60.7	287	421	1.75	1.76	1.76
A-8 Growth	<u>10.5</u>	<u>11.4</u>	<u>11.8</u>	<u>64.9</u>	<u>299</u>	<u>439</u>	<u>1.82</u>	<u>1.83</u>	<u>1.83</u>
Difference <sup>a</sup>	.1	.5	.6	4.2	12	18	.07	.07	.07
S-7 Type	10.5	10.5	11.3	69.8	269	382	1.53	1.53	1.49
S-8 Growth	<u>10.3</u>	<u>10.2</u>	<u>10.8</u>	<u>71.3</u>	<u>281</u>	<u>396</u>	<u>1.59</u>	<u>1.58</u>	<u>1.51</u>
Difference <sup>a</sup>	.2	.3	.5	1.5	12	14	.06	.05	.02

<sup>a</sup>Differences are (line 7 minus line 8) for type score, conversely for weights and gains.

<sup>b</sup>Type scores are 9, 10, 11 for Good; 12, 13, 14 for Choice, etc.

<sup>c</sup>Midsummer to fall.

(b) Growth impulse persists. "Growth" bulls are about 80 lbs. heavier than "Type" bulls as yearlings. And, they gain about 50 lbs. more their second year than do the "Type" bulls. Thus, at two years of age, they are about 130 lbs. heavier than the "Type" bulls of the same age, as shown in table 2. This is additional evidence that the growth impulse, on which the bulls were originally selected, continues to influence their development to maturity.



Table 2.

YEARLING AND TWO-YEAR-OLD WEIGHTS OF SIRES USED IN TYPE AND GROWTH  
SELECTION LINES, 1961-66<sup>a,b</sup>  
BEEF CATTLE RESEARCH STATION, FRONT ROYAL, VIRGINIA

Selection line	Age, yrs.	Breed <sup>c</sup>			AVE.
		A	H	S	
Type	1	1022	996	1010	1010
	2	<u>1296</u>	<u>1294</u>	<u>1256</u>	<u>1281</u>
Yrlg. gain		274	298	246	271
Growth	1	1083	1084	1103	1091
	2	<u>1399</u>	<u>1404</u>	<u>1430</u>	<u>1412</u>
Yrlg. gain		316	320	327	321
Difference <sup>d</sup>		42	22	81	50

<sup>a</sup> Weights at beginning of breeding season.

<sup>b</sup> Longitudinal means and gains of 9 Angus, 8 Hereford, and 10 Shorthorn bulls.

<sup>c</sup> A = Angus; H = Hereford; S = Shorthorn

<sup>d</sup> Yearling gain of growth bulls minus those of type bulls.

(c) Vitamin A helps. Supplemental injections of Vitamin A to cows in late gestation had little effect on stillbirths, Table 3 A, but important effects upon calf survival, Table 3 B. Similar injections to the calves at birth had little or no effect upon subsequent survival, Table 3 C.

(d) Branding studies completed. Brands of both Shorthorn and Hereford yearling heifers appeared to heal more favorably than did Angus, as scored subjectively 27 days after branding, as shown in Table 4. From the 1964 study, brands of control cattle healed more favorably than those of heifers treated with scarlet oil or mineral oil, and differences between the two sizes of iron, i.e., four inch height versus six inch height, were small. In 1965, healing condition improved as the width of branding iron increased, although observed differences were not statistically significant. In both years, healing scores indicated that Angus were different from Herefords and Shorthorns in response to branding.

TABLE 3. EFFECTS OF VITAMIN A INJECTIONS ON STILLBIRTHS AND CALF SURVIVAL  
TO 13 JUNE 1966<sup>a</sup>A. Cows' injections and stillbirths<sup>b</sup>

<u>Cow injected?</u>	<u>Born alive</u>	<u>Stillborn</u>	<u>Total</u>
Yes	154	12	166
No	<u>163</u>	<u>7</u>	<u>170</u>
Total	317	19	336

$$\chi^2 = 2.28; .20 < P < .30; 1 \text{ d.f.}$$

B. Cows' injections and survival

<u>Cows injected:</u>	<u>Calf's status, 13 June</u>		<u>Total</u>
	<u>Alive</u>	<u>Died</u>	
Yes	154	0	154
No	<u>156</u>	<u>7</u>	<u>163</u>
Total	310	7	317

$$\chi^2 = 7.62; P < .01; 1 \text{ d.f.}$$

C. Calves' injections and survival<sup>c</sup>

<u>Calf injected?</u>	<u>Calf's status, 13 June</u>		<u>Total</u>
	<u>Alive</u>	<u>Died</u>	
Yes	154	3	157
No	<u>156</u>	<u>4</u>	<u>160</u>
Total	310	7	317

$$\chi^2 = .12; .70 < P < .80; 1 \text{ d.f.}$$

<sup>a</sup> Total born does not include 5 calves: one hydrocephalic stillbirth, and four which died or were removed for reasons not related to general health.

<sup>b</sup> Each cow received 6 million IU injectable vitamin A (Hoffman LaRoche, Inc., Nutley, N. Y.).

<sup>c</sup> A random half of calves born alive received an injection of 300,000 IU at birth.



TABLE 4.

Observed means, Brand healing scores.

1964 - 107 yearling heifers born in 1963.

<u>Size of iron (NS)</u>	<u>Post-branding application **</u>			<u>Ave.</u>
	<u>None</u>	<u>Red Oil</u>	<u>White Oil</u>	
4" x 2/8"	1.1	2.3	2.2	1.9
6" x 2/8"	1.4	2.3	1.8	1.8
<u>Breed</u>				
Angus	1.4	2.7	2.3	2.2
Hereford	1.2	2.2	1.6	1.7
Shorthorn	<u>1.0</u>	<u>2.0</u>	<u>2.0</u>	<u>1.7</u>
Average	1.2	2.3	1.9	1.8

1965 - 107 yearling heifers born in 1964

<u>Breed *</u>	<u>Size of iron<sup>2</sup> (NS)</u>			<u>Ave.</u>
	<u>6" x 2/8"</u>	<u>6" x 3/8"</u>	<u>6" x 4/8"</u>	
Angus	2.9	1.6	1.0	1.8
Hereford	1.4	1.4	1.0	1.4
Shorthorn	<u>1.0</u>	<u>1.0</u>	<u>.7</u>	<u>.9</u>
Average	1.7	1.4	.9	1.4

N.S. = Statistically non-significant

\*,  $P < .05$ \*\*,  $P < .01$ 

<sup>1</sup> Brands subjectively scored 27 days after branding in 1964, 28 days after branding in 1965. Scores were: 0 represents optimum healing, minimal bleeding and scabbiness; 1 = slight, 2 = moderate, and 3 = extreme scabbiness in 1 or 2 digits, and 4 = extreme scabbiness, bleeding, or both in two or more digits.

<sup>2</sup> Size shows height and width of face, respectively.

V. FUTURE PLANS:

Continuation of the basic project as planned.

VI. PUBLICATIONS:

Bovard, K.P., R. H. Miller, and B. M. Priode. 1966. Selection differences in beef calves' type and growth: J. Animal Science 25: 877-878 (Abstract)

Krehbiel, Elmer V. 1966. Effects of inbreeding and environment upon reproductive performance of beef cows. Unpublished Ph.D. Thesis VPI Library, Blacksburg, Va.

VII. PUBLICATION PLANNED:

Bovard, K. P., A. L. Eller, T. N. Meacham, and B. M. Priode. 1967. Effects of size of iron on healing and legibility of cattle brands.

Bovard, K. P. 1967. Use of x-ray pictures in studies of Snorter dwarfism in cattle.

Bovard, K. P., and B. M. Priode, 1967. Genetic and environmental influences on beef Shorthorn cows' fall weights.

Rumsey, T. S., K. P. Bovard, B. M. Priode and M. L. Crandall. 1967. DDT residues in beef cows fed apple pomace.

Bovard, K. P., J. P. Fontenot and B. M. Priode. 1967. Heptachlor residues in steers fed contaminated alfalfa.

Krehbiel, E. V., R. C. Carter, K. P. Bovard, J. A. Gaines and B. M. Priode. 1967. Reproductive performance of inbred beef cows.



## Production, Inventory and Performance Data, S-10 Herds - 1966-1967

State Virginia

Location	Front Royal	Front Royal	Front Royal	Front Royal	Front Royal	
Breed of Sire	Angus	Angus	Angus	Angus	Angus	
Breed of Dam	Angus	Angus	Angus	Angus	Angus	
Line or Group <sup>1</sup>	A 1	A 2	A 3	A 4	A 7	
Percent used in project	100	100	100	100	100	
Inventory as of July 1, 1967	Cows 2 years and over	23	23	17	14	34
	Yearling heifers	5	5	7	7	12
	Bulls and steers under 1 year	6	5	6	6	14
	Heifers under 1 year	8	6	6	4	14
	Bulls over 1 year	3	3	3	4	3
	Steers over 1 year	-	-	-	-	-
Repro. Perf.	Percent pregnant <sup>2</sup>	88	69	70	63	90
	Calf survival percent <sup>3</sup>	100	100	94	83	96
Wean. Perf.	Adj. ADG <sup>4</sup>	1.88	1.86	1.89	1.79	1.96
	Av. type sc. <sup>5</sup>	12.8	12.1	11.8	11.6	13.2
Postweaning Performance	No. of bulls	2	2	3	2	4
	No. of heifers	5	5	8	7	13
	No. of steers	-	-	-	-	-
Slaughtered	No. of bulls	-	-	-	-	-
	No. of heifers	-	-	-	-	-
	No. of steers	-	-	-	-	-
Remarks	Does not include Angus, Hereford, and Shorthorn cows and calves on Heptachlor Residue Study.					

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustment: age of dam, season of birth, sex, creep feeding.

5 - Suggest S-10 scoring system; indicate if different.

## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Virginia

Location		Front Royal	Front Royal	Front Royal	Front Royal	Front Royal
Breed of Sire		Angus	Angus	Angus	Hereford	Hereford
Breed of Dam		Angus	Angus	Angus	Hereford	Hereford
Line or Group <sup>1</sup>		A8	A9	Total	H2	H3
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over	32	--	143	24	26
	Yearling heifers	13	--	49	--	--
	Bulls and steers under 1 year	18	1	56	8	7
	Heifers under 1 year	13	2	53	5	7
	Bulls over 1 year	3	2	21	2	2
	Steers over 1 year	--	--	--	--	--
Repro. Perf.	Percent pregnant <sup>2</sup>	88	100	81	100	100
	Calf survival percent <sup>3</sup>	94	88	94	100	100
Wean. Perf.	Adj. ADG <sup>4</sup>	2.01	2.01	1.94	1.38	1.65
	Av. type sc. <sup>5</sup>	12.0	12.7	12.3	10.4	11.0
Postweaning Performance	No. of bulls	4	7 <sup>6</sup>	24	2	1
	No. of heifers	16	--	54	--	--
	No. of steers	--	--	--	--	--
Slaughtered	No. of bulls	--	--	--	--	--
	No. of heifers	--	--	--	--	--
	No. of steers	--	--	--	--	--
Remarks		Does not include Angus, Hereford and Shorthorn cows and calves on Heptachlor Residue Study.				

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustment: age of dam, season of birth, sex, creepfeeding

5 - Suggest S-10 scoring system; indicate if different.

6 - Includes 3 bulls on ROP test from outside breeders.



## Production, Inventory and Performance Data, S-10 Herds - 1966-1967

State Virginia

Location		Front Royal	Front Royal	Front Royal	Front Royal	Front Royal
Breed of Sire		Hereford	Hereford	Hereford	Hereford	Hereford
Breed of Dam		Hereford	Hereford	Hereford	Hereford	Hereford
Line or Group <sup>1</sup>		H4	H5	H6	H7	H8
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over	20	19	37	37	38
	Yearling heifers	5	7	13	13	10
	Bulls and steers under 1 year	6	8	12	16	16
	Heifers under 1 year	6	5	9	13	10
	Bulls over 1 year	2	2	2	2	2
	Steers over 1 year	--	--	--	--	--
Repro. Perf.	Percent pregnant <sup>2</sup>	88	93	79	81	85
	Calf survival percent <sup>3</sup>	79	93	100	86	93
Wean. Perf.	Adj. ADG <sup>4</sup>	1.71	1.60	1.78	1.72	1.80
	Av. type sc. <sup>5</sup>	11.5	11.6	12.0	12.3	11.8
Postweaning Performance	No. of bulls	2	1	3	2	4
	No. of heifers	5	7	13	13	10
	No. of steers	--	--	--	--	--
Slaughtered	No. of bulls	--	--	--	--	--
	No. of heifers	--	--	--	--	--
	No. of steers	--	--	--	--	--
Remarks		Does not include Angus, Hereford and Shorthorn cows and calves on Heptachlor Residue Study				

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustment: age of dam, season of birth, sex creep feeding

5 - Suggest S-10 scoring system; indicate if different.

## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Virginia

Location		Front Royal	Front Royal	Front Royal	Front Royal	Front Royal
Breed of Sire		Hereford	Hereford	Shorthorn	Shorthorn	Shorthorn
Breed of Dam		Hereford	Hereford	Shorthorn	Shorthorn	Shorthorn
Line or Group <sup>1</sup>		H9	Total	S1	S2	S4
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over	--	201	21	17	17
	Yearling heifers	--	48	1	3	4
	Bulls and steers under 1 year	1	74	4	4	4
	Heifers under 1 year	--	55	3	5	9
	Bulls over 1 year	1	15	3	3	3
	Steers over 1 year	--	--	--	--	--
Repro. Perf.	Percent pregnant <sup>2</sup>	88	86	71	88	67
	Calf survival percent <sup>3</sup>	86	92	100	64	83
Wean. Perf.	Adj. ADG <sup>4</sup>	1.60	1.71	1.46	1.51	1.75
	Av. type sc. <sup>5</sup>	10.8	11.7	10.3	10.8	12.0
Postweaning Performance	No. of bulls	5 <sup>6</sup>	20	2	3	2
	No. of heifers	--	48	1	3	4
	No. of steers	--	--	--	--	--
Slaughtered	No. of bulls	--	--	--	--	--
	No. of heifers	--	--	--	--	--
	No. of steers	--	--	--	--	--
Remarks		Does not include Angus and Hereford and Shorthorn cows and calves on Heptachlor Residue Study.				

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustment: age of dam, season of birth, sex, and creep feeding

5 - Suggest S-10 scoring system; indicate if different.

6 - Includes 2 bulls on ROP test from outside breeders.



## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Virginia

Location		Front Royal	Front Royal	Front Royal	Front Royal	Front Royal
Breed of Sire		Shorthorn	Shorthorn	Shorthorn	Shorthorn	Shorthorn
Breed of Dam		Shorthorn	Shorthorn	Shorthorn	Shorthorn	Shorthorn
Line or Group <sup>1</sup>		S5	S7	S8	S9	Total
Percent used in project		100	100	100	100	100
Inventory as of July 1, 1967	Cows 2 years and over	20	28	32	--	135
	Yearling heifers	1	15	11	--	35
	Bulls and steers under 1 year	2	12	15	2	43
	Heifers under 1 year	4	14	13	--	48
	Bulls over 1 year	2	2	2	2	17
	Steers over 1 year	--	--	--	--	--
Repro. Perf.	Percent pregnant <sup>2</sup>	30	86	86	43	76
	Calf survival percent <sup>3</sup>	67	81	93	67	83
Wean. Perf.	Adj. ADG <sup>4</sup>	1.62	1.76	1.74	1.88	1.70
	Av. type sc. <sup>5</sup>	10.0	13.2	11.8	11.7	12.0
Postweaning Performance	No. of bulls	1	4	4	3 <sup>6</sup>	19
	No. of heifers	1	15	11	--	35
	No. of steers	--	--	--	--	--
Slaughtered	No. of bulls	--	--	--	--	--
	No. of heifers	--	--	--	--	--
	No. of steers	--	--	--	--	--
Remarks Does not include Angus, Hereford, and Shorthorn cows and calves on Heptachlor Residue Study						

1 - Purebreds, Grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustment: age of dam, season of birth, sex, and creep feeding

5 - Suggest S-10 scoring system; indicate if different.

6 - Includes 1 Bull on ROP test from outside breeders.

## Production, Inventory, and Performance Data, S-10 Herds - 1966-1967

State Virginia

Location		Front Royal	Front Royal			
Breed of Sire		Purebred	Various			
Breed of Dam		Purebred	Various			
Line or Group <sup>1</sup>		Herd Total	Crossbred			
Percent used in project		100	100			
Inventory as of July 1, 1967	Cows 2 years and over	479	--			
	Yearling heifers	132	--			
	Bulls and steers under 1 year	173	13			
	Heifers under 1 year	156	10			
	Bulls over 1 year	53	12			
	Steers over 1 year	--	--			
Repro. Perf.	Percent pregnant <sup>2</sup>	81	81			
	Calf survival percent <sup>3</sup>	90	86			
Wean. Perf.	Adj. ADG <sup>4</sup>	1.78	1.92			
	Av. type sc. <sup>5</sup>	12.0	11.6			
Postweaning Performance	No. of bulls	63	12			
	No. of heifers	137	--			
	No. of steers	--	--			
Slaughtered	No. of bulls	--	--			
	No. of heifers	--	--			
	No. of steers	--	--			
Remarks		Does not include Angus, Hereford and Shorthorn cows and calves on Heptachlor Residue Study				

1 - Purebreds, grade, line, sire number, crosses, treatment, etc.

2 - Use palpation percent of percent of cows that gave birth to calves (dead and alive). If palpation record is used, do not include those pregnant cows that were disposed of before calving.

3 - Percent of calves born (dead and alive) that survived to weaning. The product of percent pregnant and survival percent gives weaning percent.

4 - Indicate adjustments: age of dam, season of birth, sex, and creep feeding

5 - Suggest S-10 scoring system; indicate if different.









